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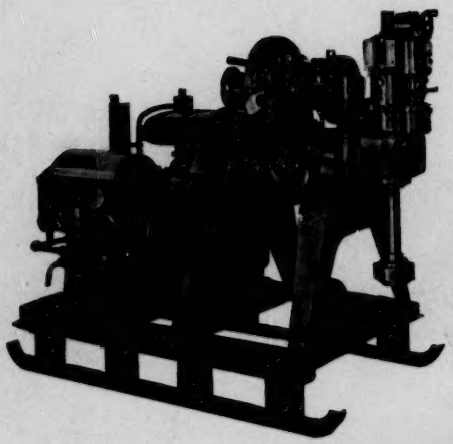

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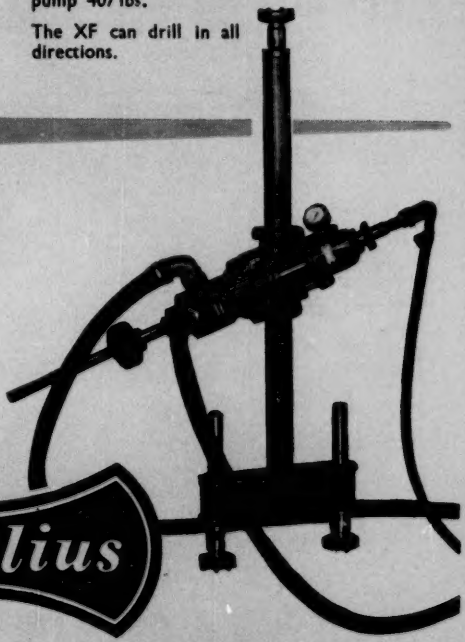

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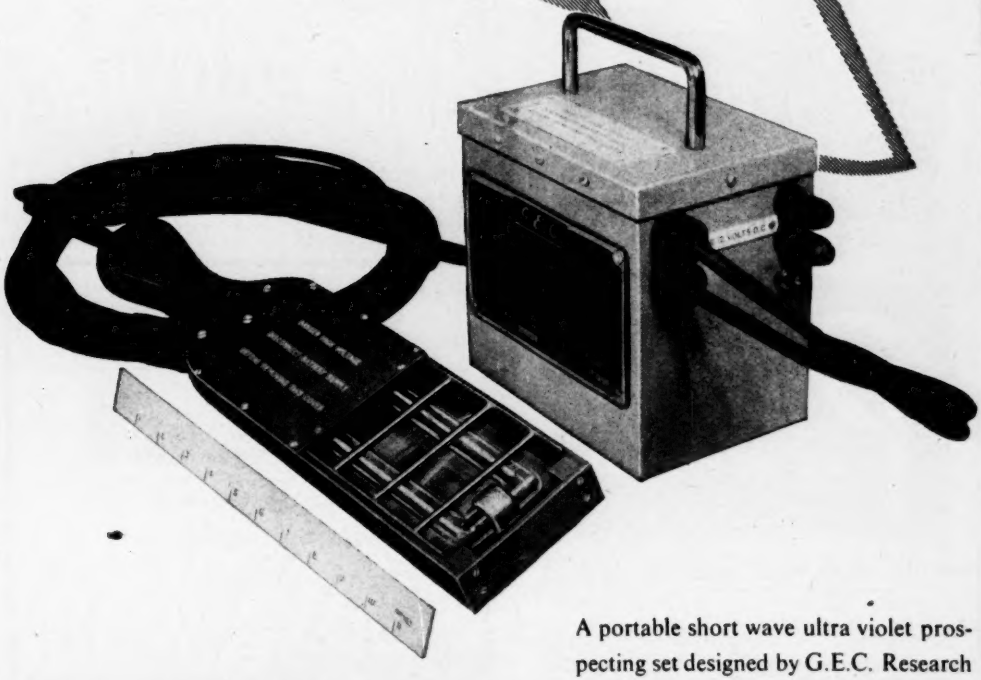

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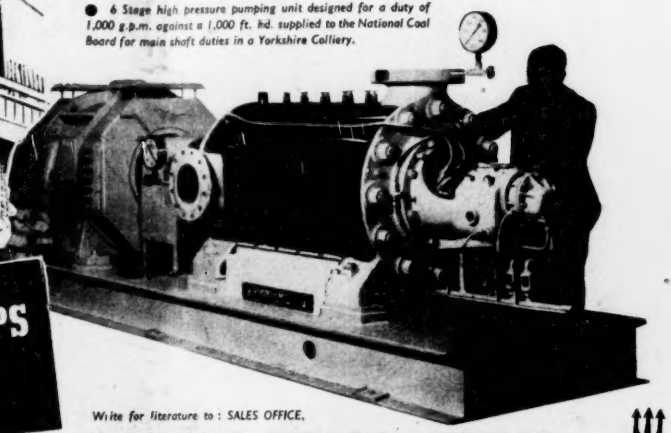

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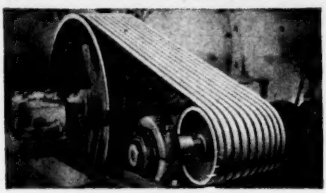

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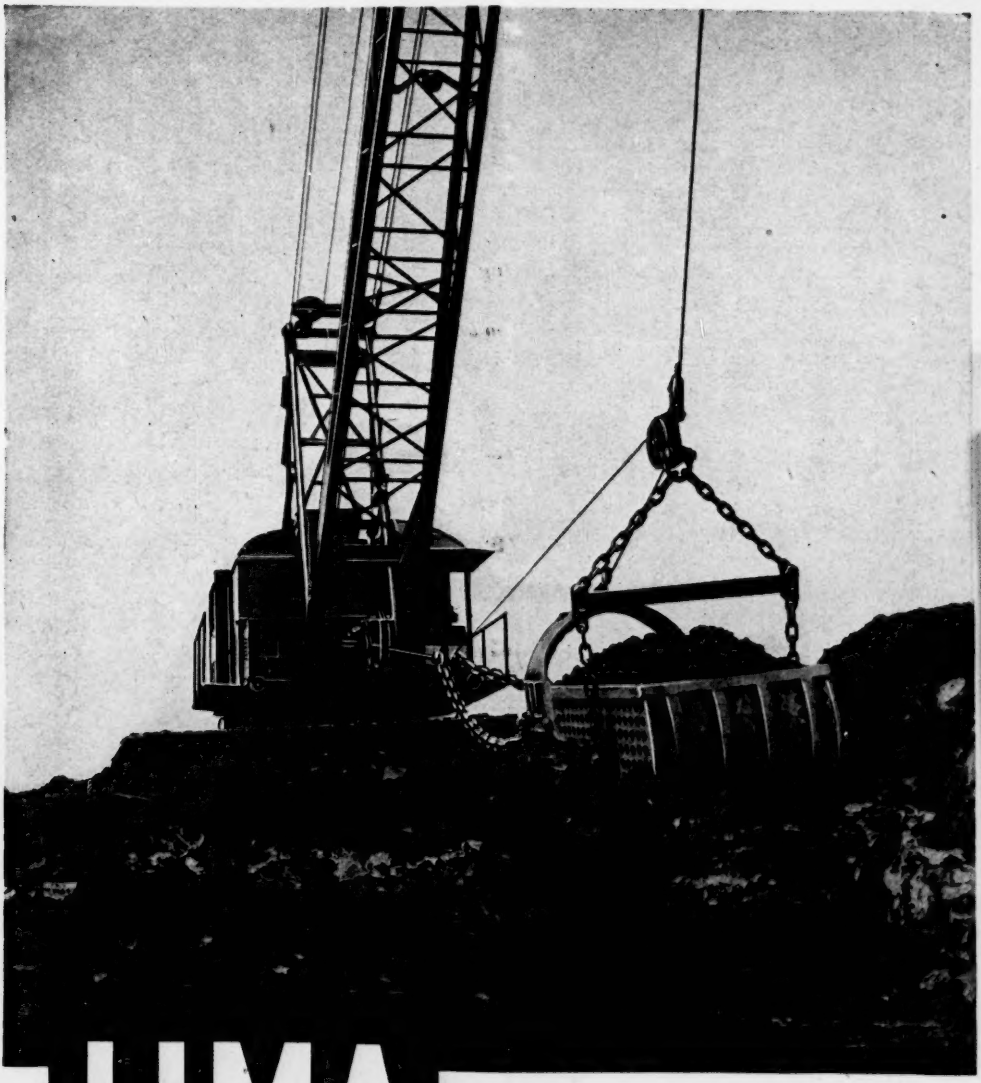

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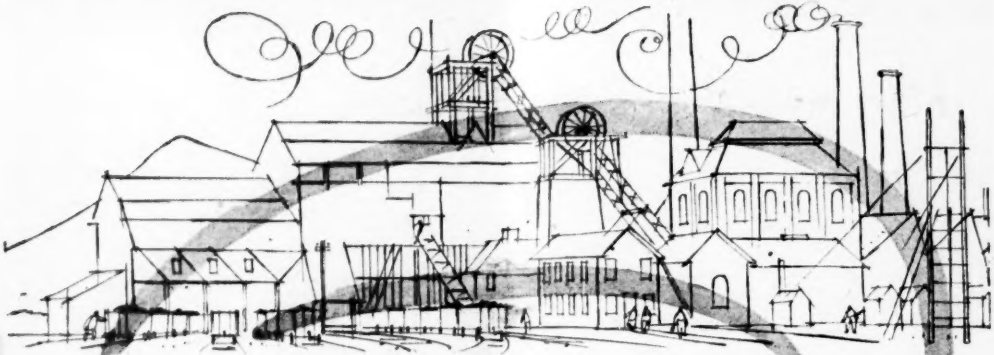

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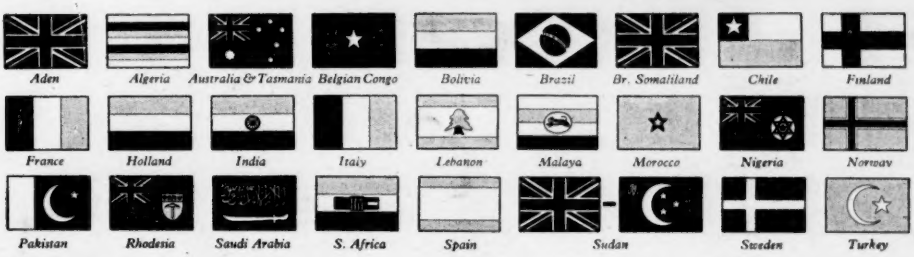

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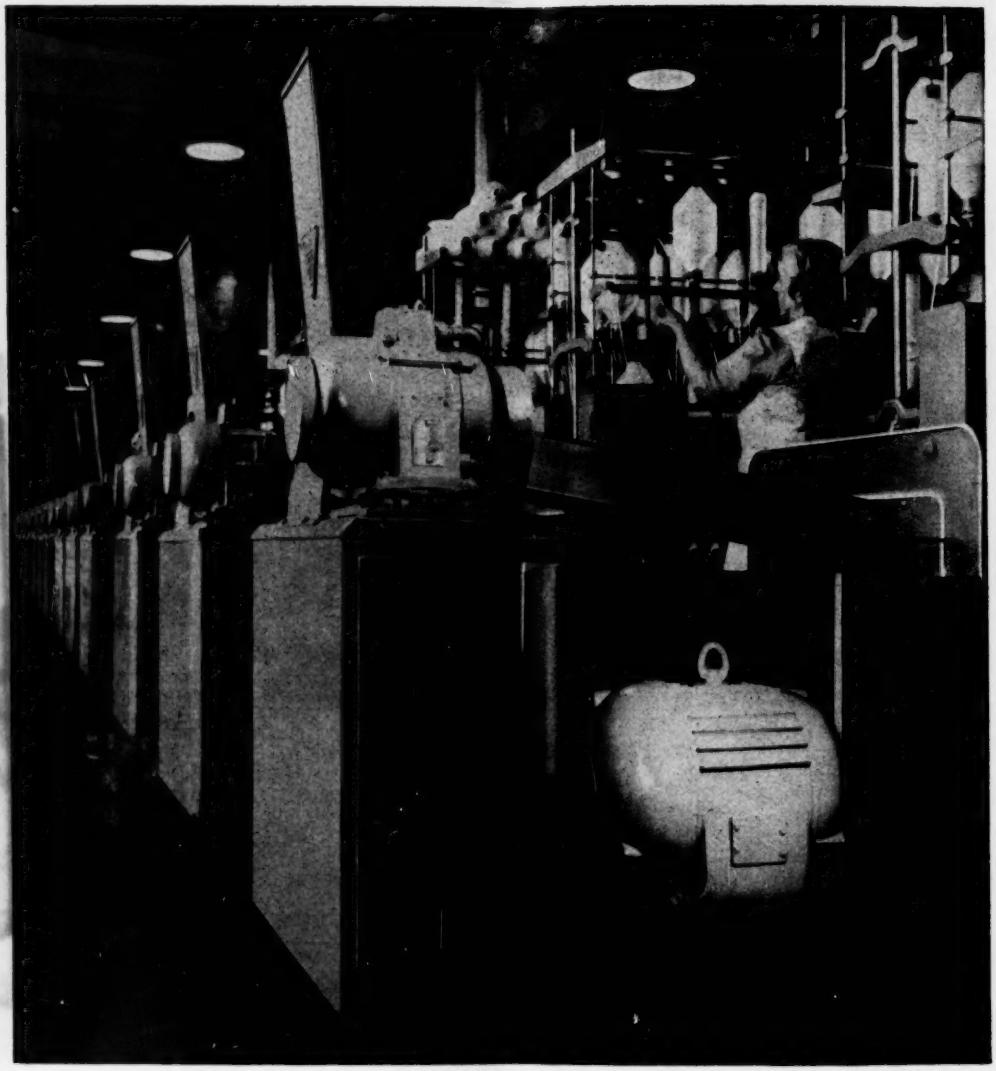

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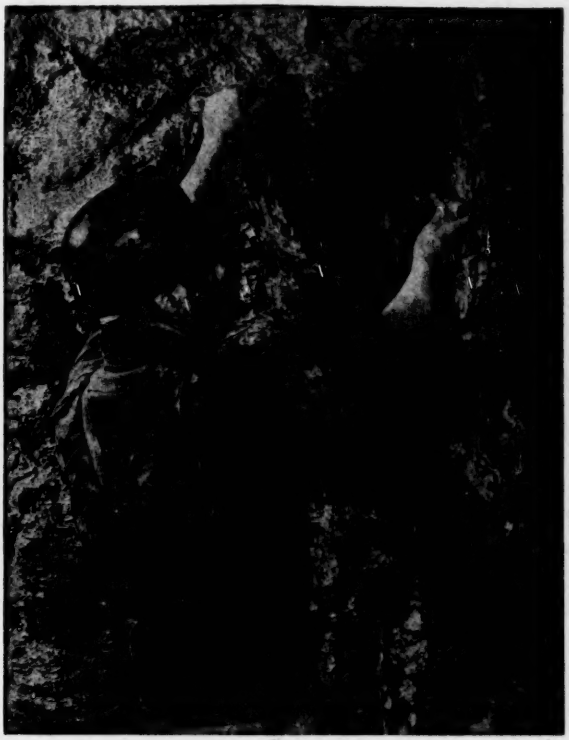

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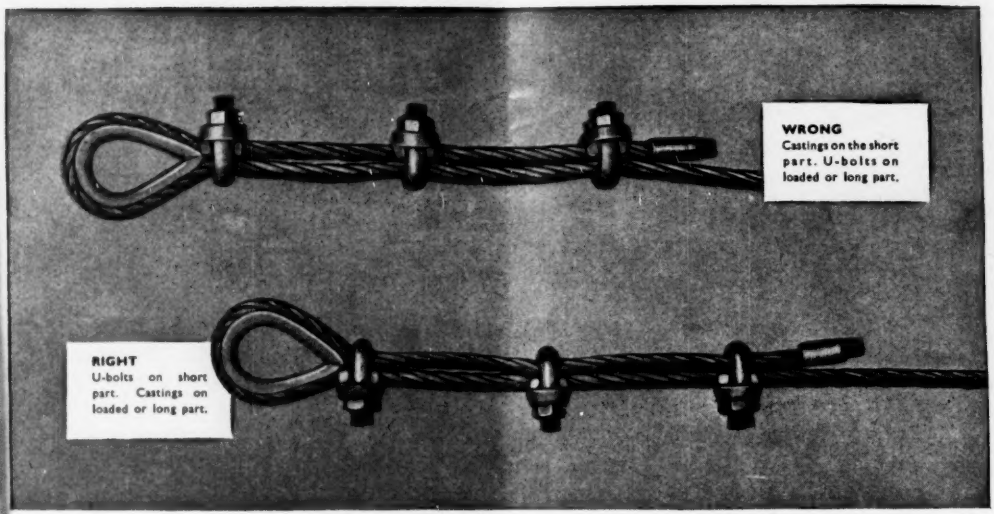

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CONTENTS

Notes and Comments ... 399
From Our South African Correspondent ... 401
Iron and Steel—The Importance of New Deposits ... 402
Power Transmission in Mining Machinery ... 404
The Fulmer Research Institute ... 406
Technical Briefs ... 407
Effective Extraction of Metals from Non-Ferrous Residues; New Process Recovers Lithium Sulphate from Mixtures; The Production of High Purity Zinc; New Tin Stripper Introduced; "Libra" Boxwood Scales.
Metals, Minerals and Alloys ... 408
The Mining Markets ... 410
Company News and Views ... 411
Rhodesian Copper Companies' Big Tax Liabilities; Stilfontein Offers One for Ten at 18s.; Rand and O.F.S. Mine Returns for September; "Indians" Continue to Make Steady Progress.
Company Meetings ... 412
Blyvooruitzicht Gold Mining Co. Ltd.; Indian Copper Corporation.

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NOTES AND COMMENTS

U.K. Companies Meet Newfoundland Premier's Challenge

The suggestion that a number of British companies should band together to investigate and subsequently develop the resources of Newfoundland and Labrador was put forward as a challenge to British inventiveness and enterprise by Mr. Joseph Smallwood, Premier of Newfoundland, in August last, when he addressed a meeting in London organized by the Federation of British Industries.

Generally speaking, this was interpreted as a good opportunity for the United Kingdom to participate in the exploration and development of Canadian resources and to make up much of the ground previously lost in this respect through currency difficulties. Certainly, any scheme involving the expenditure of hard currency to successive post-war British Governments has demanded very close inspection indeed, but there was undoubtedly a tremendous opportunity for the profitable investment of U.K. capital if Premier Smallwood's challenge could be effectively met.

In the event, the response has been most encouraging and dispels the view, current in some countries, that British enterprise died many years ago. For barely more than three weeks after the diminutive Premier of Newfoundland made his statement, Messrs. N. M. Rothschild & Sons announced that arrangements had been made for a small group of British and Canadian technical experts to visit Newfoundland this year to report on the suggestion. This British industrial survey team, which will report on the possibilities of utilizing Labrador's resources, is comprised of representatives of six large and important U.K. companies: the Anglo American Corporation of South Africa, the Anglo-Newfoundland Development Co., Bowater's Newfoundland Pulp and Paper Mills, The English Electric Co., Frobisher Ltd. and the Rio Tinto Co. In referring to this group of companies, Mr. Smallwood said that it was a "sort of a syndicate" which description is in line with his original suggestion that a U.K. syndicate should be formed with a capital of about £2,000,000 for exploration only. After that had been achieved he believed the syndicate would need a minimum of £300,000,000 for development.

From a note published in these columns on August 29 last, it will be seen that the country's potential resources are as vast as they are varied, and there is little doubt that should the survey team report favourably, this "sort of a syndicate" might only be an advance guard of larger groups from Britain.

S. Rhodesia May Support Gold Industry by Subsidies

While the recent tax concession, in the form of depletion allowances granted to Southern Rhodesia's gold producers, was hailed as far-sighted and one which could be emulated with advantage in other major gold producing countries, it must also be viewed as an action born out of necessity to stave off the collapse of the colony's marginal producers. It is possible, of course, that the Rhodesian Government intended the measure to go hand in hand with an expected higher price for gold, but since this latter idea has been firmly knocked on the head by responsible U.S. Treasury Officials, it appears that the concessions made in the last budget, however sound they may have been at the time, can now be considered as being too little and too late.

There was some justification, however, for not introducing a direct subsidy last April, for at the Rhodesian Mining Federation's congress at Bulawayo on September 23 last, Mr. G. A. Davenport, Minister of Mines for Southern Rhodesia, said that it was the lack of money which made it impossible to subsidize the colony's gold mines during the current financial year. But, he added, plans were being made to introduce some form of subvention in the next financial year.

Meantime, he did not think there would be any immediate increase in the price of gold, despite the international interest taken in the matter. His belief was that a decision affecting the gold price was unlikely with the presidential elections pending and that, in any case, it was improbable that the U.S.A. would agree to increase the gold price while it was still experiencing inflation.

Insofar as the colony's gold mining industry was concerned, he said that it had declined alarmingly, due primarily to increased costs, and although costs had been showing signs of dropping in certain directions, he felt that the threatened action of some of the British engineering unions

to stop piece-work and overtime, might again touch off the spiral.

Commenting more specifically on the deterioration of the gold mining industry, he said that it was not known what percentage of mine closures were due to the fading out of values. Mines did not last for ever, he said, and at this stage of Southern Rhodesia's mining history, it was not easy to replace an exhausted mine with a new one.

One of the important contributory factors keeping most of the existing gold mines in production was the revenue received from premium gold sales which since May 1 last had risen from 11s. an oz. to 18s. with the most recent sales at 19s. an oz. While this was not a great deal of revenue, he hoped it would play its part in keeping the mines in production until the market improved. In any event, the Government, he said, were prepared to adjust the depletion allowance if it did not afford the benefit that was intended.

The depletion allowances granted in the Southern Rhodesian budget last April amounted to 10 per cent for gold mines and 5 per cent for base metal and coal mines, the percentages being calculated on the value of the gross output and the allowance being limited to 50 per cent of the taxable income before charging depletion.

Australian and New Zealand Gold in the Free Market

General details of the methods by which Australian and New Zealand gold production is sold on the world free market are recorded in the October quarterly survey of the Australia and New Zealand Bank.

Late in 1951, after the International Monetary Fund had announced the change in their policy towards the sales of gold at premium prices, Australia declared that its gold production would be sold abroad on the free market subject to the granting of an export licence by the Commonwealth Government and the provision, where necessary, of a valid import licence granting admission into the country of the buyer. It will be recalled that under the original procedure fine gold was reduced to 22 ct. and formed into strips, prior to packing and despatch abroad, overseas buyers being required to supply an affidavit that the gold purchased would be used for industrial purposes only. These affidavits were intended to provide an assurance that gold was not going into private hoard. However, it was found that the 22 ct. strip form was often inconvenient to genuine industrial users, and on August 5 last Australia announced that fine gold could in future be offered for sale on the open market. Australia's income from gold is at the rate of over £A.16,000,000 a year, paid for entirely in United States dollars, including the premium.

All the Australian gold available for sale abroad is offered through one organization which is representative of gold producers. This central selling organization offers gold for sale by tender, and bids are accepted by cable, with instructions as to the deposit of the necessary dollars in New York. Oversea buyers have found it necessary to appoint a reputable agent in Australia, and some of the banks are already providing this service.

Since August 16 last New Zealand gold producers or their agents holding gold dealers' licences have been allowed to sell their production overseas on the open market, provided full proceeds of such export are received in United States dollars at not less than $35 per f.oz. However, the New Zealand producers or licensed dealers require a general licence to export, as well as a permit to export in respect of individual gold shipments.

The value of gold production in New Zealand is, of course, much smaller than in Australia and amounts to only about £N.Z.1,000,000 annually.

Brighter Outlook for Steel

The resounding performance of the steel industry last month fortifies the expectation that the end of the steel shortage is in sight and that the time may not be far distant when complete freedom of distribution may be restored. In five successive months last year's rate of production has been exceeded, and the September output, though not an all time record, is the highest ever for that particular month. An annual rate of 17,149,000 tons last month has only once been exceeded—in November, 1950. It has been made possible by a spectacular expansion of pig iron production which itself reached a new record in September rising to an annual rate of 10,845,000 tons. Still more blast furnace capacity will come into operation before the end of the year, and it is largely upon this expectation that the hopes of a further rise in steel production are based.

It should not be hastily assumed that all supply problems are at an end. In the happiest circumstances it will take time to overcome the acute shortage which has existed throughout the whole of the year. But there is evidence that many industries which were unable to cover their requirements are now obtaining supplies more nearly approaching their full requirements and further progressive improvement may now be anticipated.

It was the short yield in scrap supplies which was the main cause of last year's shrinkage in steel production, and in this respect there has been little improvement. But the industry has made a quick switch. New blast furnace capacity has been brought into production and by increasing the ratio of pig iron in the steel furnace charges the steel makers have emancipated themselves from their dependence on foreign scrap.

More steel will now help to give an impetus to the metal using industries and indirectly help the export drive. Another reasonable anticipation is that when contracted shipments of American steel are completed it will no longer be necessary to continue this heavy drain on our dollar reserves.

Ample supplies of steel will in fact exercise a profound effect on the nation's balance of payments and restore full activity to a wide range of industries.

Mr. Braithwaite on Taxation

The bankers' dinner at the Mansion House on Tuesday of this week provided, as it traditionally does, a convenient forum for those engaged in formulating fiscal policies of this country to review the developments of economic policies since the budget.

Mr. John Braithwaite, Chairman of the Stock Exchange, in his address, forcibly outlined the case for bringing to an end the overtaxation of companies caused by inadequate depreciation allowances. The results, he said, that flowed from this very unsound practice were that industry was overtaxed. "The Revenue may properly gather the fruit but it is suicidal also to fell the tree, branch by branch, year by year, until it ceases to bear at all." While conceding that the Exchequer must have its revenue, he asserted that it would be infinitely more healthy for industry to pay a higher rate of tax on true profits than, as at present, a lower rate on phoney profits. The publication of artificially inflated profits created a false impression and gave rise to wage claims that would be seen to be unjustified if profit were computed and published on a realistic and true basis.

He believed the correction of this matter to be of the first importance, for the country could not much longer stand the present level of taxation.

South Africa

(From Our Own Correspondent)

Johannesburg, October 1

The past month has seen further important developments in potential uranium production in South Africa. It was officially announced that eight further gold mines are to undertake this work—bringing the total to 13—and according to authoritative circles still further properties are to come under the scheme.

The latest companies to undertake this work are two on the Central Rand—Randfontein Estates and Luipaards Vlei—and six in the Orange Free State—F. S. Geduld, Western Holdings, President Brand, President Steyn, Welkom and Virginia.

SIGNIFICANCE OF THE BASAL REEF

This is the first time that the Free State has come into the uranium picture and it seems inevitable, in view of all the mines in this new field exploiting the Basal reef horizon that in due course, all the Free State mines will recover this important by-product.

At the present stage, three plants are to be erected. Two of these will be at Welkom and President Brand respectively, and they will be fed with residues from the five Anglo American group properties. Viginia will have its own plant, but it is generally assumed that at a later date it will handle the slimes from the adjoining Merriespruit mine.

Investigations have shown that uranium exists in the other reefs in the Orange Free State, notably the "A," "B," and Leader reef horizons, although no assay values have been published—nor are they likely to be under the Atomic Energy Act. Nevertheless, its presence does suggest the possibility that they may become of economic importance on the basis of their joint uranium content. At present, apart from very few scattered spots, these reefs have been regarded as outside the pay limit on gold content alone or, at best, of only marginal importance. Should the presence of uranium alter this situation, the new mines will become of far greater economic significance than was originally hoped.

URANIUM IN THE CENTRAL RAND

It is, however, on the properties of Randfontein and Luipaards Vlei on the Central Rand where the presence of uranium becomes spotlighted as a factor of major importance in the future prospects of individual mines. On both these properties uranium occurs in economic quantities in the Bird reef, which under present levels of costs and gold price is unpayable as a gold producer, but which can be exploited on joint content.

In the case of Luipaards Vlei, ore from the Bird reef is to be treated by bringing back into use a portion of the old reduction plant which was rendered redundant with the centralization of these operations at the Turk reduction plants. The restored section of the old plant will handle around 30,000 tons of rock a month.

The net result will be, when the plant comes into operation in about two years' time, that the output of gold will rise to some extent by the addition of recovery from the lower-grade ore put through this mill. When this is added to revenue from current gold production and uranium, earnings of the property should be sufficient to bring about higher dividend-payments.

The price payable for the uranium produced will be related to cost on a basis designed to ensure the redemption with interest of the capital cost of the plant and certain ancillary expenditure over a period of ten years from the time the plant is in full operation, and should provide a reasonable margin of profit. Taxation will be payable by the company on its uranium profits at the rate applicable to gold mining companies.

EXTENDED WORKING LIFE

At Randfontein, even though the current crushing rate is well below the full capacity of the reduction plant, a certain tonnage of Bird reef rock will be substituted in place of rock being drawn from other reefs on the property. It may be assumed, however, that should it become possible to increase the milling rate through an improvement in the labour supply, more high-grade ore will be milled. On this basis, working revenue may not show any marked increase compared with the other uranium producers.

What is important in respect of both these mines is that appreciable additions have been made to their ore reserves and in consequence their working lives have been extended. In the case of Randfontein Estates this is of great significance. At the present time, the company's working profit is running around 1s. 8d. per ton milled based on the sales of gold at the official price. Even allowing for additional revenue from premium gold sales this cannot be regarded as producing much of a margin, particularly when it is considered that the past year has seen a decrease in working revenue on this mine from 30s. 2d. to 29s. 1d. per ton milled.

Although the nominal life of the property was estimated at 15 years, the trend of costs and profits over the past year or so were undoubtedly giving rise to grave doubts as to whether this, the largest of all South African gold mines, might not have to cease operations long before this time was up.

On the basis of the arrangements made by these two properties—which incidentally include the provision of the finance necessary to open up the Bird reef horizon for mining—it may well be that a number of other producers with marginal or non-payable deposits of Bird reef on the West Rand, and Kimberley reef on the East Rand may have many years added to their lives through becoming uranium producers.

In the field of ordinary mining activities, the past month has seen one setback and a fair amount of encouraging news. Free State Geduld has been most unfortunate in suffering a serious inrush of water in No. 2 shaft. At one stage this was at the rate of 2,500,000 gallons a day, with the water rising in the shaft at about 20 ft. per hour. This is probably second only to the flooding which took place at Venterspost during sinking operations some years ago. In order to stabilize the flow, large quantities of water have had to be pumped into the shaft from the surface. Once this position is reached, the shaft will be plugged and cementation operations undertaken. Up to the present there are no indications of how long this mishap will delay the starting up of underground development.

A most significant borehole result has been obtained on President Brand where a borehole put down some 3,500 ft. south of No. 1 shaft intersected values of 1,207 in.-dwt. Apart from this being a most satisfactory result in itself, it adds confirmation to the theory that a zone of high values, similar to that existing in Western Holdings and Free State Geduld, which lie immediately to the north-north-east, runs through the middle of this property. The first indication of this possibility was earlier in the year when a borehole to the north of No. 1 shaft yielded 3,253 in.-dwt.

THE PALEY REPORT—VII

Iron and Steel—The Importance of New Ore Deposits

The iron and steel industry operates on such an enormous scale that it is impossible to glance at more than a few of the aspects presented in the Paley Report. Moreover, the industry is so powerful financially and technically that it is far less dependent than most of the minor and newer metals on governmental impulse and assistance. The technology of past years, moreover, has been responsible for the present plant and equipment and the application of new technology is only likely to occur at a moderate pace, especially in view of the greatly increased cost of new plant—necessarily on a scale corresponding with the magnitude of the industry.

The table below shows both for pig iron and ingot steel the 1950 level of consumption in the U.S.A. and other countries of the Free World, compared with the projected increased requirements by 1975. From this it will be seen that the total Free World demand is expected to increase by a little over 60 per cent within this period. During this period, however, the U.S.A.'s dependence on imported iron ore is expected to increase very substantially.

Projected Primary Steel and Pig Iron Consumption in the Free World

	Pig Iron			*Ingot Steel*		
	1950	1975	%	1950	1975	%
	(*million s.tons*)		*Increase*	(*million s.tons*)		*Increase*
U.S.A.	65.0	100.0	54	96.8	150.0	62
Canada	2.5	4.4	75	3.4	6.0	75
U.K.	10.8	15.7	45	18.3	26.5	45
Free Europe	31.6	52.3	65	39.0	64.4	65
Australia and N.Z.	1.4	3.0	114	1.6	3.5	114
Japan	2.5	6.5	158	5.0	12.8	158
Others	3.5	8.7	147	3.6	10.3	182
Free World	117.3	190.6	62	167.7	274.5	64

The question which has been in the minds of leaders of the industry, for some time past, has been the supply of ore of current grade (say 50 per cent Fe) and its cost. The chart on the opposite page shows that by 1950 the U.S. was already an importer of iron ore, to the extent of some 10,000,000 tons, and by 1975 reliance on external sources of ore supply is expected to have risen to about 70,000,000 tons, while over the same period requirements in the rest of the Free World will have risen from about 100,000,000 tons to about 170,000,000. These forecasts suggest that Free World iron ore production outside of the U.S. will have practically to double itself in the next 25 years, while production in the States is not expected to increase by much more than 10 per cent.

DIMINISHING GRADE OF U.S. ORES

In 1950 Lake Superior mines contributed 91,000,000 s.tons of ore besides 21,000,000 from other districts of the U.S. Imports were 2,000,000 from Canada, 3,000,000 from Chile and 4,000,000 from other countries adding up to a total of 121,000,000 s.tons of ore supply. While the U.S. domestic reserves are still very large the high grade Lake Superior ores should approach exhaustion in the next 25 years and at the present time 73 billion tons out of a total of 79 billion tons of ore reserves carry only from 25 per cent to 35 per cent Fe. For the last 15 years a growing proportion has had to be beneficiated to meet the steel mill requirements and this proportion will grow

So far as the future of the Lake Superior supplies is concerned much depends on the success in bringing the Taconite ores into the present economic sphere. Fine ground Taconite can be concentrated by magnetic separation to form small agglomerates running 65 per cent Fe. Non-magnetic Taconite and deep level magnetic Taconite would enlarge the reserves almost indefinitely. While mining costs would be high there should be savings in transportation and fuel so that possibly pig-iron costs might not be more than 10 per cent above present level and eventually perhaps not more than 5 per cent.

Broadly speaking, prospective supplies of iron and steel material can be relied upon to satisfy normal needs. Currently, U.S. ore reserves are estimated at some 80 billion s.tons containing 25 billion tons of iron. Of these total reserves 2 billion tons are of 50 per cent grade or better but 75 billion tons are sub-marginal and of off-quality.

WORLD RESERVES

Total Free World reserves are computed at some 300 billion tons of ore containing about 115 billion tons of iron, of which 53 billion tons are of 50 per cent Fe grade or better, so the possibilities of maintaining current grade supplies to consumers by means of imports can be appreciated. The following are the chief sources of supply listed in the report, in million tonnes.

Estimated Free World Resources of Iron Ore
Measured, Indicated and Inferred
(*Million tonnes.*)

	50% *Fe and above*	35-50% *Fe*	25-35% *Fe*
Brazil	20,000	50	700
Canada.....	4,000	200	100
Cuba.....	—	15,000	—
France	—	10,500	10,000
French West Africa ...	2,000	—	—
India.....	20,000	—	60
Indonesia.....	—	1,500	—
Liberia.....	50	250	1,000
Sierra Leone	100	250	1,000
Southern Rhodesia.....	—	—	100,000
Sweden.....	2,500	—	—
Union of South Africa	—	11,000	—
United States	2,000	4,500	75,000
Venezuela.....	1,000	—	—
Others	1,500	6,500	—
Free World total.....	53,000	50,000	200,000

The U.S. can, of course, draw increasingly from Canadian deposits of iron ore, especially those now being developed in Labrador, though for a certain time Steep-rock and Michipicoton supplies will be available down existing routes to Pittsburgh and Chicago mills. The railroad from the Labrador Mines to Seven Islands on the St. Lawrence, a distance of 365 miles, is now being constructed. The cheapest route thence is up the St. Lawrence and across the Great Lakes, but the channel is limited to 14 ft. draught and a total of 6-8,000,000 tons of ore per annum. Alternatively, ore can be shipped to Montreal and railroaded 700 miles to Pittsburgh, or can be shipped by ocean carrier to Philadelphia or Baltimore. However, to move ore in quantity from Labrador to mid-Western mills will necessitate the construction of the St. Lawrence seaway which would reduce costs by more than 25 per cent

and permit a four-fold expansion of shipments. The report declares that the completion of the St. Lawrence seaway is imperative, both on economic and strategic considerations.

Elsewhere reserves are being developed by U.S. steel companies, more particularly in Venezuela and Liberia. The report anticipates that Venezuela will not only supplant Chile but will eventually far exceed present imports from that source. An output of 1,000,000 tons is forecasted for 1955 rising to 25,000,000 tons some 15 years later.

STEEL PRODUCTION OUTSIDE U.S.

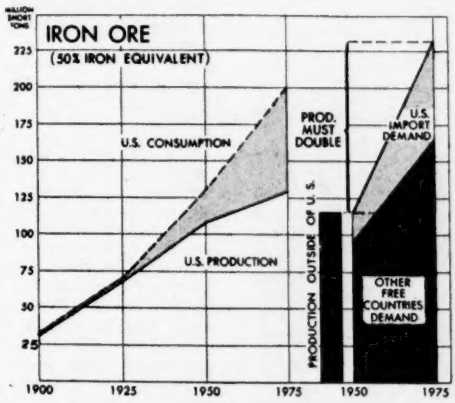
U.K. production of steel is expected to reach 20,000,000 tons in 1955 provided a corresponding increase in exports can be secured. Owing to the low grade of domestic ore supply, the importation of high-grade ores is necessary, more particularly from Sierra Leone and Canada. Output of steel in the Dominions, not including India, totalled close on 6,000,000 s.tons in 1950

Western Europe produced about 40,000,000 s.tons of steel in 1950, but growth is hampered by lack of investment funds. This the Schuman plan aims at meeting.

Japan produced some 10,000,000 tonnes of steel pre-war, but the 1950 output was less than 5,000,000 owing to shortage of raw material. Pre-war the practice was to charge open-hearth furnaces with 35 per cent pig iron and 65 per cent scrap, of which 40 per cent was imported from the U.S. Limiting factors in the future will be shortages of coal and scrap.

SCRAP POSITION

The extent to which the world steel production has been dependent on supplies of scrap is stressed in the report. The United States in 1950 required 69,000,000 s.tons of scrap and 65,000,000 tons of pig iron to produce 120,000,000 tons of ingots and rough castings. Taken together, steel mill and foundry furnaces rely upon scrap for almost half their metallic materials. The scrap supply is classified as "home" scrap, accounting for rather more than half the total, which is re-cycled where produced and does not leave the mills and foundries. The second class is "prompt industrial" scrap which returns to the steel mills within 90 days. The third class is denominated "obsolescent" scrap and the supply is governed by the amount of ferrous products produced in earlier years, and naturally does not currently reflect present requirements. The supply of obsolete scrap was some 22,000,000 s.tons in 1950 and this will not increase much in the near future, consequently the amount of pig iron used will have to rise. For the longer future the prospect is better, as the current high level of iron and steel production will gradually be drawn on, and up to 32,000,000 tons of obsolescent scrap should be available in 1975.



This chart published in the Paley Report emphasizes the greatly increased dependance which it forecasts for the United States on the supply of imported iron ores. Canada must play a vital part in filling this gap, and in this connection the completion of the St. Lawrence Seaway is held to be imperative

AMERICAN STEEL TECHNOLOGY

Reduction of iron ore in the United States is effected in the first stage by the manufacture of pig iron in the blast furnace; requiring 1½ tons of ore, nearly 1 ton of coke and ½ ton of limestone to produce a ton of pig-iron. Subsequently, a mixture of pig-iron and scrap are melted in the foundry furnaces and poured into moulds to make castings, or they are processed in steel furnaces and poured into ingot moulds. Continuous casting, copied from non-ferrous practice, is now being applied to steel and promises substantial saving in the cost of the finished product; it may prove applicable to not less than a third of the industry's tonnage. Continuous casting will sharply curtail the supply of home scrap. Nine-tenths of the steel made in the U.S. is supplied from open-hearth furnaces, about 5 per cent from electric furnaces and somewhat less from Bessemer converters. These latter use pig-iron almost entirely whereas the electric furnace charge is almost entirely scrap. Efficiency of the steel making furnace has been improved by using oxygen or oxygen-enriched air. A new type of converter—the turbo-hearth—which produces steel by blowing hot or enriched air along the surface of a shallow bath of molten pig will, it is hoped, reduce processing time from 8-12 hours in the open-hearth furnace to 12-20 minutes in a 50-ton turbo-hearth besides saving a great deal of floor space.

THE INDUSTRY'S RAW MATERIALS

Besides iron ore, coal, coke, limestone, fluorspar and manganese are essential in addition to the chief alloy materials required for the production of special steels. Coke has been in short supply in the U.S. for some time but this lag will gradually be overtaken. Reserves of coking coal are here, as elsewhere, smaller than those of other grades, but restrictions on general use, blending and washing should offset this. Coke oven capacity is also in arrear—8 per cent of the output still comes from beehive ovens which lose by-product gas and chemicals. Among the by-product ovens more than a third were over 25 years old and owing to pressing their lives have been appreciably reduced and replacement is at present limited by shortages of refractory bricks; when these are available for oven linings the necessary expansion should be secured.

Reserves of limestone in the vicinity of the iron-steel plants in the United States should impose no limit on expansion in blast-furnace output. Known deposits of fluorspar are likely to fall short of future requirements but this can be remedied by increased imports and synthesis from fluorine in phosphate rock. The alloying metals are dealt with separately under their respective titles.

STOCKPILING POLICY

On the question of stockpiling of iron-ore, pig-iron scrap, etc., the question is not regarded as of high importance. At times like the present it would be impracticable as the industry is consuming every ton of these materials obtainable. If production declined some stockpiling might be possible. There would be some advantages in stockpiling pig-iron as compared with iron-ore or scrap as it would demand less space than ore and would oxidize less than scrap.

Power Transmission in Mining Machinery

By JOHN HYLER

The following article presents a summary of the more important devices used in the mining industry for the transmission of mechanical power from prime movers to driven machines. The author points out the salient features of these equipments and discusses the various benefits accruing from their use, in an article which appeared in *Canadian Mining Journal* Vol. 73, No. 9.

Many improvements and advances have been made in mechanical transmission of power over the entire face of industry during the last couple of decades. In the mining and kindred industries, in common with many others, V-belt drives have found their way into a position of increasing prominence. Roller-chain drives are highly convenient, and have found many places of application, especially as the industry has become more highly mechanized.

Flexible couplings are found in various types and forms. Different types of clutches are found in use in different places, including centrifugal clutch applications. Due to the frequency with which it is necessary to step motor speed down over a considerably large range, many speed reducers are found in use. Many of these are of herringbone-gear type, though worm-gear speed reducers are also found in considerable number. Too, one occasionally sees a fluid drive in use. Variable speed mechanisms are continually on the increase.

It is obvious that where electric mining machinery is in use, transmission of power to the working elements must be absolutely positive. Because it forms a completely-positive drive on the one hand, and a very simple drive on the other, which requires little maintenance, roller chain is highly favoured for such purposes. Highly-efficient mucking shovels, for instance, are completely fitted out with roller-chain drives of competent type. One such shovel makes use of a double-strand two-inch-pitch chain, three single-strand two-inch-pitch chains, and one single-strand 2½-inch-pitch chain. Extremely satisfactory performance has been obtained with all these chains, maintenance cost is low, and the drives are never affected by misalignment. Drives for both the conveyor and the gathering head are of roller-chain type, as well as the axle drives.

DRIVE FOR MINE CAR CONVEYORS

In powering rolling stock, power-transmission devices are of increasing importance. Some electrically-powered mine cars are provided with conveyors, the conveyor in the car being driven by means of right-angle motor reducers, mounted on one side. Considerably used in coal mining, these cars have primary advantages of stopping and switching small cars, eliminating special transportation at the coal face, the improvement of loading efficiency, and so on.

Conveyors used underground are often provided with worm-gear reducer drives. This makes an especially good drive for a face conveyor. Where main belt conveyors are employed for bringing coal or ore to the surface, they are usually driven from the head end, and are fitted with an adjustable brake of some kind, which automatically engages by spring action in case of shut-down or power failure. This prevents the conveyor belt from running backwards or from drifting forward more than a few feet. The arrangement is often such that solenoid action disengages the brake when current is applied to start the conveyor. Main conveyors leading out of the mine are quite safe under almost any conditions, explosion-wise, because the driving motor may be located outside the mine.

Very often, each conveyor of this type is individually driven from an electric motor through a herringbone gear speed reducer and a roller chain drive. A motor of correct size and horsepower is installed in each case, that will carry the load involved. So far as mine hoists are concerned, roller-chain drives of heavy-duty type are often found highly efficacious.

HELICAL GEARS ON HEAVY HOISTS

Higher-powered hoists present a different problem in regard to power application and transmission, due to the heavy load they must of necessity carry. Double-drum hoists make use of two motors. Electrical drive has supplanted most other types of hoist drive practically altogether. In the tandem two-drum hoist, each drum shaft often carries a single helical gear, which is powered by a pinion shaft to which the motor is connected.

At least one of the two drums (sometimes both) is provided with a friction or toothed clutch. In some instances, one of the two drums is keyed to its shaft. Helical gear sets, made by gear specialists for this type of installation, are a revelation in smooth-flowing power to the drums. Flexible couplings of the type having grooved hub members, with a member of flexible steel ribbon placed through the grooves in serpentine fashion, are quite often employed for connecting the motors to the pinion shafts on a heavy mine-hoist drive.

As indicated, where belt conveyors lead from underground to a position on top, the driving machine and the drive can be made completely safe, explosion-wise, by mounting it outside the mine and driving to the conveyor headshaft. There are many cases, however, where drives must be employed underground under conditions not entirely safe for the average electric motor. For such cases, compressed-air motors are particularly high in favour. This is certainly not to say that compressed air motors are valued only on the basis of being explosion-proof, but this is nevertheless a point held in mind in connection with potential explosions.

ASPECTS OF AIR MOTORS

Air motors are made in different types and are much employed in operating conveyors, ventilating fans, and other equipment underground. They are available in different types. For instance, some of these motors are reversible and some are non-reversible. Some firms specializing in building air motors make them in reciprocating piston type, and in a variety of sizes. Some of them are four-cylinder motors, while others have five cylinders. They are useful for various mineshop duties, for driving small chain or rope drums and winches, for operating short lines of shafting, and directly in the mine for operating fans, blowers, concrete mixers, loading machines, conveyors, etc.

Some of these air motors are geared, while others have no gearing, the shaft being directly connected to the motor. Non-reversible motors develop more power than reversible motors. They operate at higher speeds and use less air, but they will not start heavy loads at low speeds quite as well as a reversible motor will.

Reversible air motors operate equally well in either direction, and can be instantly reversed. They develop less power, but have somewhat greater torque than non-reversible motors. Air consumption per horsepower is

higher than for the non-reversible type, but a unique valve arrangement on certain motors keeps air consumption remarkably low, as compared to other types of motors.

VARIABLE SPEED DRIVES

Where it is desirable for any reason to vary speed of a conveyor at will, thereby transporting more or less material, it is necessary to incorporate a variable-speed mechanism into the drive. One of the most interesting and efficient types of variable-speed mechanisms employed in connection with conveyor drives incorporates a special chain, which makes the drive completely positive. The chain involved in this particular type of drive is a highly-ingenious one, being made in such manner that it is both self-pitching and self-forming.

An instance in point of use of such a variable-speed drive on a conveyor is where an apron conveyor is employed for reclaiming iron ore from the bottom of a huge stockpile. A tunnel is provided under the stockpile of ore, so that ore automatically finds its way on to the running conveyor. Because it is possible to control speed of the conveyor by means of the variable-speed mechanism incorporated in the drive, ore may be reclaimed by the apron-feeder conveyor at any desired rate. The apron feeder delivers to an inclined-belt conveyor, for transfer to a heavy density plant.

Reciprocating-type feeders also have variable-speed mechanisms incorporated in their drive many times. An instance has been noted in the processing of magnesite, where the ore is fed from the bottom of a mill feed bin by two heavy-duty reciprocating-plate conveyors, to two long trunnion-type revolving scrubber screens. Either one or both of the scrubbers may be operated at once, the drive to the reciprocating feeders mentioned includes a variable-speed mechanism.

BLENDING USES VARIABLE SPEED DRIVES

Variable-speed mechanisms have also been found highly efficacious where blending operations are in process at the mine. For instance, cases have been observed where bituminous coal was being blended at the mine before shipment. Assuming that it is desirable for some reason to ship for commercial purposes say, a 1¼ in. by zero-in. slack, or a 2 in. by zero-in. slack, which is definitely uniform in its size fractions, the product can first be broken down by screening it into several sizes, as for instance ¼ in. by zero-inches, ¼ in. by 1¼ in., 1¼ in. by 2 in., or similar dimensions. These various screenings are then delivered to separate bins located adjacent to one another, and these bins are used as surge bins, to take care of the non-uniformity of these sizes as they are delivered from the mine through the primary screening processes.

The blending operation starts with such surge bins, each being equipped at its discharge with a feeder, the drive of which is controlled by a variable-speed mechanism. Therefore, speed of discharge from each, any or all of the bins may be varied almost instantaneously at the will of the operator. Some very fine variable-speed mechanisms are equipped with speed-setting indicators, so that given settings may be permanently recorded. Where this is the case, recordings can be made of given blends, and it is always a simple matter to duplicate them thereafter.

CENTRIFUGAL CLUTCH ON CONVEYOR OPERATIONS?

In cases where it is necessary or desirable to pick up a load gradually, without any strain on component parts of a drive, a centrifugal clutch is quite often employed. Such a clutch incorporates members which are thrown outward by centrifugal force as the drive picks up speed. Since centrifugal force varies as the square of the speed, the drive is picked up gradually and progressively, yet very definitely.

One instance observed where a centrifugal clutch was used to high advantage, was in a variable-speed drive for a conveyor used to provide uniform feed of ore from a mine bin to a crusher. This variable-speed drive includes a 5 h.p. electric motor, a centrifugal clutch, a variable-speed transmission, and a double-reduction herringbone-gear speed reducer. All these units are mounted on a self-contained welded steel base. Roller chain connects the reducer output shaft with the conveyor head shaft.

There are some cases where variable-pitch sheaves and controls making use of V-belts are employed, where an actual enclosed variable-speed mechanism is not considered necessary. Some of these drives are very interesting. The high efficiency inherent in a V-belt drive, together with the speed-changing characteristics possible, make drives of this kind an interesting possibility.

V-belt drives provide for better transmission of power than old-time flat belts, yet they provide as well all the shock-absorbing characteristics of earlier belt drives. There are some places where this is highly important, one of which is on a drive to a ball mill.

SHOCK-ABSORBING DRIVE ELEMENTS

The amount of punishment which must be taken by a motor driving a ball mill largely depends on the type of drive employed and especially the means by which the electric motor is connected to the mill. On a direct drive, one should always be sure to interpose one or more flexible couplings between the motor and the mill. Such couplings will absorb shock that would otherwise be transmitted directly to the motor. Direct drives are generally employed only on heavier ball mills. It makes no difference how carefully one may install a mill and align it with the motor, there is always a possibility that a certain amount of misalignment will occur after installation. For this reason, flexible couplings should definitely be employed.

The immediate drive to the ball mill is from a pinion to a large gear. Consequently, the driving problem on hand is to properly connect the driving motor with the pinion shaft, and allow for absorption of shock in between. Different kinds of flexible couplings may be used. Some use gear-type flexible couplings to high advantage; others have employed flexible couplings making use of a number of flexible steel plates. Where it is not expected that misalignment will ever be severe, a single flexible coupling can sometimes be used and will be found adequate. However, a double coupling, or even two flexible couplings separated by a so-called floating shaft, will usually be found better, especially on a very heavy mill.

Where a floating shaft is used, a greater amount of misalignment may occur without harming the motor or the machine. The longer the floating shaft used, the greater is the amount of misalignment the drive will accommodate. Where parallel misalignment occurs (which is a very difficult type of misalignment to handle with a single flexible coupling), it will be so distributed between the two couplings by the floating shaft, that each one of the couplings will be compensated only for angular misalignment.

V-BELT DRIVES ON BALL MILLS

There are definite electric problems to be considered in selecting and installing a motor for heavy ball-mill drive, but we pass these by. We observe, however, that many ball mills employ an indirect drive to high advantage. Such a drive must incorporate means for reducing the speed between the motor and the machine. This is often accomplished through use of a V-belt drive. A V-belt drive is much less costly than some of the other types mentioned. On ball mills of small and medium size, it has the advan-

tage that speed adjustments can be made by selecting the proper size of motor sheave. If and when they can consistently be used, V-belts are especially desirable, for they serve to absorb shocks in the drive, and thus to isolate the motor from the punishing vibration otherwise imparted by the tumbling mass in the ball mill.

Not every authority agrees touching the largest size of ball mill it is practical to power by means of an indirect V-belt drive. One thing which has a very definite bearing on the subject is the particular kind of V-belt one uses.

LINK-TYPE V-BELTS AND FLUID DRIVES

One highly-interesting aspect of V-belts is the fact that some have now been developed and put into use which may be readily adjusted for length. These are a so-called link-type belt, made up of a series of independent leather links fitted with studs and holes in such manner that they may be readily coupled together. To loosen or tighten such a belt, in cases where there is no centre adjustment provided for a drive, is a simple matter.

Such V-belts are quite widely used through industry, and have found way into the mining field at various places. Some of them are being employed, for instance, on highly-efficient flotation machines, which are outstanding for their ability to provide intense aeration and agitation at the cell bottom.

When one thinks of a fluid drive, he generally thinks of it in connection with automotive practice. Fluid drives are highly modern, and are a development of hydrodynamic transmission of power through utilization of the kinetic energy of the mass and velocity of a fluid. Performance characteristics of a drive of this type include smooth acceleration and power, free from shock loads, impacts, and torsional vibration.

Fluid drives are now quite readily available to industry which incorporate a driving motor and a fluid coupling integral in the same unit. Such have been made available in various types and among their many duties, are finding their way into the mining and allied fields. An instance observed was one where an oscillating conveyor, used for delivering the sinter-charge to a rotary mixer in a sinter plant is operated by a 3 h.p. fluid drive. There are, of course, many possible and practical applications for such drives in the industry.

The Fulmer Research Institute

The Fulmer Research Institute was founded by the late Col. W. C. Devereux, managing director of the Almin group of alloy factories, who invited British industrialists to join him in forming an independent institute to carry out sponsored research. A site was acquired at Stoke Poges, Bucks, where an existing mansion was converted into laboratories, and in July, 1947, the Institute was officially opened by Sir Stafford Cripps. On September 30 last, an open day was held to mark the completion of the first five years of work.

The Institute has been staffed and equipped primarily to deal with metallurgical problems, but many problems falling outside this field have also been studied. Of particular interest to the mining industry is an investigation instituted to determine whether the residual stresses set up in the tungsten carbide type of rock drills during the brazing operation were responsible for the tips fracturing upon cooling after brazing. The method adopted was to attach electrical strain gauges to a tungsten carbide tip and then grind away the tool holder to relieve the residual stresses. From the change in strain recorded by the gauges in conjunction with a Savage & Parsons strain gauge measuring unit, the residual stresses could be found by a simple calculation. Specimens of fractured tips and of tips with strain gauges attached were exhibited at the open day.

Much valuable work is being done on the extraction of metals by the decomposition of halides, a novel feature of this research being the use of catalytic distillation for subhalide refining. An entirely new process has been developed for the catalytic distillation of aluminium. It may be used for purifying scrap or aluminium of commercial purity, or for the extraction of aluminium from alloys produced by direct thermal reduction in the arc furnace. Further laboratory work is in progress under the joint sponsorship of Aluminium Laboratories Ltd. and International Alloys Ltd. By another method—i.e., that of intermediate formation of its stable halide—beryllium has been distilled at temperatures far below those at which its vapour pressure is sufficiently high for its direct distillation. This method of indirect distillation is being applied to other metals, among them being titanium which is also being prepared by disproportionation of titanium halides and by hydrogen reduction of halides. Much work on this future engineering material is being done by the Institute.

Among many successful developments arising from researches carried out at Fulmer are a new high strength aluminium/copper/cadmium alloy, a series of aluminium/tin bearing metals, and ceramic coatings for lining combustion chambers of gas turbine engines to protect them from distortion and cracking by overheating.

In the five years since it was opened the Institute has trebled its income and doubled its staff, new buildings have been added, and the scale of work has trebled. Eighty-eight patents have been applied for on behalf of sponsors, of whom there are over a hundred, and twenty-five scientific papers have been published. Among the sponsors are the Admiralty; various branches of the Ministry of Supply including the Atomic Energy Research Establishment, the National Gas Turbine Establishment and the Royal Aircraft Establishment; British Railways, a number of Research Associations, many leading British firms, and the largest aluminium-producing companies in Canada and the United States.

The Institute's entire income is derived from fees for researches and all results arising from investigations, including patents, are the property of the sponsors. No dividends are distributed to shareholders, any excess income over expenditure being ploughed back to provide greater or improved research facilities.

The total income for the first five years was over £250,000, of which 52 per cent was from Government Departments. Direct dollar earnings from Canada and the United States were over $60,000, representing 11½ per cent of the total. British industry contributed 36½ per cent and there has been a steady growth of sponsorship from this source. Through the contacts established in the United States the Institute is able to offer its British sponsors the possibility of exploiting their research results on a much wider scale than would be possible if it confined its activities to the Commonwealth.

TECHNICAL BRIEFS

Effective Extraction of Metals from Non-Ferrous Residues

The world-wide shortage of metals, aggravated during the second world war and the years following by an unprecedented demand, has given rise to considerable interest in the conservation of non-ferrous metals. The possibilities of extracting the total metallic content from non-ferrous residues has commanded particular attention, and for this reason specific interest has been aroused by the claims of L. H. Dowling & Sons to extract the entire metallic content of non-ferrous residues.

The company have not released details of the process by which this impressive result is achieved, nor have they given any indication of the plant developed for the task by members of the staff during the last fifteen years. Nevertheless, independent evidence substantiating the company's claims is given in a test report from the Engineer in Charge of the City of Birmingham Industrial Research Laboratories which states that a sample of brass residues as received, and a sample of recovered metal after processing from the same residues by the Dowling process, showed that "all usable metallics from large granules to 100 mesh contained in the residues were recovered and clean."

The Dowling process is said to be able to treat successfully residues of over 15 per cent metallic content, and thus will reclaim the metallics which once were lost from large quantities of residues and other wastes containing metal. The method recovers metals individually, and is able to treat residues having as little as 5 per cent of metallic content, although in this case the procedure may not prove economical. All the primary metals and their alloys contained in the residues from electric, coke, gas or oil fired furnaces can be processed, with the entire metal content reclaimed, and although the firm has not treated every form of residue, it nevertheless has been able to process every type of residue presented for treatment. The oxide content is not reclaimed, and the process is stated to be an economical one.

The metals refined from residues appear as a mixture of pure particles, which vary in size from ingot to the fineness of 200 mesh dust. Regardless of size, it is claimed that each piece contains the virgin colour of the metal—a rare achievement in a commercial process. In addition, concentrates reclaimed from skimmings can be re-smelted and put to productive use within 72 hours. The service offered by the firm is of greater value when the metal content of the processed residues is high, although a low metal content of perhaps 10 to 15 per cent gives great advantage when the metal concerned is of high value.

The sieving test for comparative particle size carried out in Birmingham showed that 21.6 per cent weight of the metal residues were retained on the $\frac{1}{4}$ in. sieve, while the same sieve retained 17.5 per cent weight of the recovered metal. Passing the $\frac{1}{4}$ in. sieve and retained on the $\frac{1}{8}$ in. was 9.0 per cent weight of the metal residues and 16.7 per cent weight of the recovered metal. The 7 mesh sieve retained 7.7 per cent weight of metal residues and 13.3 per cent weight of the recovered metal, and after orifice reductions through the 10, 18, 25 and 52 meshes, the 100 mesh sieve retained 13.3 per cent weight of metal residues and 0.5 per cent weight of the recovered metal.

An analysis of residues and recovered metal showed that 20.4 per cent weight of dirt, metallic oxides and metal dust passing 100 mesh, as well as 10.2 per cent weight of water-soluble material, were contained with the 69 per cent weight of metal residues comprising a representative, weighed quantity of cleaned metal residue. In an equally representative and cleaned, weighed quantity of recovered metal the dirt, metallic oxides and metal dust passing 100 mesh totalled 0.65 per cent weight of the whole, water-soluble material presented a trace only, and metallic residues totalled 99.0 per cent. The report concluded that the metal recovered by the process was mainly granular.

Among the many and perhaps obvious benefits accruing from use of the Dowling service, is the elimination of picking over the residues for pieces selected for size and metal content. This cuts expenditure considerably by saving time and reducing labout costs, and in addition erases the possible danger of contaminated metal on re-melting. It is significant, too, that at L. H. Dowling and Sons charge of refining is based upon the weight of the residue processed, and not upon the weight of the metal extracted.

New Process Recovers Lithium Sulphate From Mixtures

The U.S. Bureau of Mines has developed a new process for extracting lithium sulphate from two of its four major sources simultaneously, according to reports. Lithium, its alloys and salts, have become increasingly important as industrial materials. The weight of this metal by volume is only about 60 per cent that of water, and lithium now has a wide variety of uses, ranging from purifying helium gas by removal of nitrogen to the scavenging of molten metals of undesirable impurities as well as in the welding of aluminium.

Although lithium is found in many mineral compositions, four only have commercial importance, namely amblygonite, lepidolite, zinnwaldite, and spodumene, the latter being the most important source. Since amblygonite and spodumene frequently are found in the same ore, a single process for treating a mixture of them would make possible more use of amblygonite as a source of lithium and would obviate separating the two minerals when they occur together.

The new process, scientifically described in the report, yielded recoveries ranging from 66.7 per cent to 97.3 per cent of the lithium in the ore mixtures. A single set of conditions was determined under which good recoveries of lithium could be obtained from either of the two minerals and mixtures of them.

The Production of High-purity Zinc

The production of high-purity zinc has been described by G. H. Kent (*Chemistry in Can.*, 3, 31, 1951). The Hudson Bay Smelting & Refining Co., at Flin Flon, Manitoba, produce a concentrate having the following composition; zinc, 45.7 per cent, iron 14.6 per cent, copper 0.39 per cent, lead 0.34 per cent, cadmium 0.12 per cent, antimony 0.043 per cent and arsenic 0.43 per cent together with 0.036 oz. gold and 1.38 oz. silver per ton.

The concentrate is first of all roasted to get rid of the bulk of the sulphur and the calcine leached with 2 per cent sulphuric acid. The copper and cadmium in the leach solution are subsequently removed by agitation with zinc dust and the purified zinc solution electrolyzed in cells having lead anodes and aluminium cathodes. The sulphuric acid produced during electrolysis is recovered and re-used in the leaching process, and the zinc is stripped from the aluminium cathode and melted in oil-fired reverberatory furnaces. One furnace is used for cathode zinc containing less than 0.003 per cent lead and yields a high grade zinc containing 0.0019 per cent lead whilst a second furnace produces a zinc containing about 0.0059 per cent lead. If the value for zinc rises above 50 per cent in the concentrate then a higher roasting temperature is required to remove the sulphur.

New Tin Stripper Introduced

Enthone Inc., of Connecticut, has introduced a new alkaline chemical for rapid dissolving of tin, lead, and tin-lead alloys. The stripper, which is kept in steel or stainless steel containers and does not deteriorate with age, is claimed to be effective for the rapid removal of tin, lead, and tin-lead electro-deposits, heavy solder and hot dipped coatings, and will not attack base metals such as copper, brass, bronze, steel and stainless steels. The stripping action on both tin and lead is fast and thicknesses of the order of 0.005 in. to 0.010 in. are removed in one hour, according to the company.

The new stripper can also be used for removing solder from torch or iron soldered pieces as well as hot dipped soldered articles but, unlike acids, does not cause any dimensional change in the base metal.

"Libra" Boxwood Scales

The new process developed originally by Hilger & Watts for the production of "Libra" scales was described under identical title in our September 26 issue. In that note the accuracy of the scales was given as a guaranteed ± 0.0005 in. over a foot. This figure should, of course, have read ± 0.005 in. over a foot.

METALS, MINERALS AND ALLOYS

The U.K. primary metals statistics for August published on the opposite page reflect a situation of rising inventories and easing prices which are at present the common experience of most European countries. Washington, however, appears to be making heavy weather of what is in the main an easing situation, as the fourth quarter I.M.C. allocations reported here last week confirm. It is apparent that the Administration is not in any mood to make a bonfire of controls and it must therefore be assumed that their stockpiling programmes have still a long way to go.

COPPER.—Price controls and allocation have been under fire in the U.S. during the past week. The copper industry has formally requested the removal of all price controls and has also recommended that N.P.A. stockpile purchases be deferred until the price issue has been settled. Copper producers have been consistently irked in recent weeks at the continuation of the 24.50c. ceiling on domestic copper while the import price has been remaining firm at a 36c. level and this irritation has undoubtedly been accentuated by the several concessions which have been made to domestic high-cost producers such as the recent 27.50c. ceiling granted to Calumet and Hecla. Discussions between O.P.S. and copper producers are now awaited.

On the question of allocation the N.P.A. has made it clear that it believes that it will be necessary for this to be continued to the middle of next year. Both domestic refined copper production and scrap copper supplies for the fourth quarter of 1952 will be below earlier estimates and Mr. McDonald, the N.P.A. Administrator, is reported to have said that there is at present no prospect that sufficient copper can continue to be provided for an expanded civilian demand equal to pre-Korean consumption plus anticipated military requirements and resumed stockpiling. At present authorized civilian consumption is running at about 50 per cent of the pre-Korean figure.

This general American picture of continued copper tightness is in some conflict with the recent tendency in Continental markets for buyers to hold off apparently in expectation of an easing in the American import price. Whatever the reason, the Continent seems unable at present to absorb its own copper and substantial tonnages (notably from Hamburg) are finding their way to the more profitable American market. As with other metals, the key may lie with American stockpiling policy which, as ever, is wrapped in secrecy. It is, however, perhaps significant in this respect that Mr. Fowler, the defence mobilization chief, pointed out last week that so far practically none of the 64,000 tons of copper withdrawn from the stockpile in the year to June 30 last, has yet been repaid.

No solution is yet in sight to the wage dispute on the Northern Rhodesian copperbelt. On Monday of this week the African Mineworkers Union rejected the copper companies' latest and final offer and although the companies are now willing to submit the offer to arbitration the Union is considering strike action depending on the outcome of a ballot which is taking place this week. The European Mineworkers' Union and the companies, on the other hand, have agreed to submit their wage dispute to arbitration.

LEAD.—The New York spot price has reacted to the declining London price sooner than seemed likely a week ago, and on Tuesday of this week it was cut from 16c. to 15c. Allowing 2c. off for import duty, shipping and other costs, this put the New York price at the equivalent of £104 per ton, compared with Tuesday's London price of £98. No sooner had this reduction taken place in the New York price than the London price fell a further £11 to £87. Buyers on the London market seem to be holding off while the market is falling and it may well be that last Tuesday's cut in the New York price has contributed to the further fall on the London market where traders are anxious to attract American buying to dispose of the considerable tonnages shipped to London in anticipation of the opening of the market. American traders are believed to be reluctant to make a further price cut until the 15c. level has been well tested and clearly a reaction in the London price must come sooner or later.

Repercussions from the resumption of lead dealing on the London Metal Exchange are being felt widely and variously. Empire producers are naturally anxious and Canada in particular seems likely to suffer a decline in earnings from her export contracts to the U.K. France has, since the war, become largely self-sufficient in lead as a result of increased North African production but several of the mines and plants in French North Africa are believed to be relatively high-cost producers and it remains to be seen how far they can follow a decline in price. Meanwhile the necessity for obtaining import licences is presumably acting as a brake on French buying in London. Reports from Western Germany, Czechoslovakia and elsewhere suggest that the Continental free markets are disappearing in favour of more competitive dealings on the London Metal Exchange.

The long-awaited revival of battery shipments in the U.S. is now under way. After reaching the quite exceptionally low level of 728,000 units in March last, shipments have been progressively increasing each month and in August, were reported at 2,904,000, the highest for nearly two years. This may help to ease the weight of stocks on consumers' hands, which increased by 14 per cent during July to the near record figure of 132,146 tons.

In the U.K. also stocks are still well above 100,000 tons, as is shown in the table on the next page, although most of this is Government-owned and may never go on the market.

TIN.—The table on the next page showing production for the first seven months of this year in the five main tin-producing countries suggests that world production this year will not be substantially different from the 165,500 tons produced in 1951. Considering the effect of the U.S. steel strike on the tinplate industry, it seems improbable that world consumption will be substantially above the 135,000 tons for 1951 which emphasizes the extent to which the equilibrium of the market depends on American stockpiling. In this connection, it is significant that the *American Metal Market* has recently quoted an unofficial estimate which credits the R.F.C. with having transferred 15,700 tons of tin to the stockpile during the first six months of this year. So long as stockpile purchases of this magnitude continue—and they may well do so for a matter of years—it seems unlikely that the U.S. Government will be prepared to oblige the trade and get out of the tin market. In any event, the R.F.C. has contracted for Indonesian and Congo tin up to the end of next year and N.P.A. officials have indicated as recently as last week that allocation and inventory controls will not be removed at least for another six months.

Following the Bolivian Government's creation last June of a state minerals export monopoly, the Government has now announced the establishment of a new agency to be known as the Mining Corporation of Bolivia, which will be responsible for exploration as well as for the production and utilization of minerals and the importation of the necessary plant and equipment. A Reuter despatch from La Paz suggests that the corporation will also handle exports, although no indication is given of how the activities of this new corporation will tie in with the Minerals Bank of Bolivia in which the export monopoly was originally vested. The report of the commission appointed by the Revolutionary Government to consider the problems relating to nationalization of the mines was due on Thursday of this week and is expected to result in the early signing of a nationalization decree by the President of the Republic.

ZINC.—The split price in the U.S. market ended on Tuesday when the 13½c. level became operative throughout the market, this further easing being a reflection of continued light demand. The Ministry of Materials has reduced its price by £4 to £118 in sympathy.

Although U.S. smelter stocks of slab zinc had declined slightly at the end of September to a total of 94,541 s.tons this was probably due mainly to a corresponding decrease in U.S. production during the month, which totalled 76,019 s.tons in September, compared with 78,167 s.tons in August. Shipments in both months were practically the same at a little over 78,000 tons.

In London, the success of the resumption of lead dealings on the Metal Exchange is naturally giving rise to speculations as to the possibilities of re-opening for zinc. As, however, the Government has accepted some risk of dollar losses in permitting lead dealings it seems unlikely that any further relaxations will be permitted until the lead market has been running for sufficiently long to give a fair indication of its effect on dollar earnings.

ALUMINIUM.—What with the D.P.A. raising its sights on domestic production capacity by another 200,000 tons and a short-fall in this year's expansion programme due to the steel strike's brake on constructional work and to drought in the south-

east and Pacific north-west, prospects for decontrol of aluminium in the U.S. have faded for the moment. D.P.A's revised production capacity target is now in the neighbourhood of 1,700,000 tons per annum or almost exactly double U.S. production in 1951. The most recent increase of 200,000 tons is stated to be due largely to the Munitions Board's upward revision of stockpile requirements. So far as possible D.P.A. will attempt to secure this additional capacity from non-integrated domestic producers. It remains to be seen how successful the Administration is in assisting new producers to break in to this heavily capitalized and highly organized industry. At the moment standing room on the bandwaggon seems more likely to be occupied by mining companies already established in other fields—witness Anaconda's plans, which are now reported to be completed, for the formation of a subsidiary—the Anaconda Aluminium Co.—which is to build a $45,000,000 aluminium reduction plant near Columbia Falls, in Montana.

QUICKSILVER.—The Indian Government is reported to be ready to allow the export of 10,000 flasks with a levy of Rs. 300 per flask.

WOLFRAM.—The market remains steady with prices unchanged. Supplies are coming in more plentifully from various sources, and U.K. importers are showing more disposition to pick and choose.

DIAMONDS.—The Central Diamond Selling Organization reports a decrease in sales both of gem and industrial diamonds, in the third quarter of this year as compared with the second. Third quarter sales of gems were £10,100,000 and of industrials were £5,400,000 compared with £11,300,000 and £8,100,000. Cumulative totals for the first three-quarters of 1952 were £34,500,000 for gems and £19,200,000 for industrials compared with £36,000,000 and £13,700,000 respectively for the corresponding nine months of 1951. Sir Ernest Oppenheimer and a delegation from the Diamond Corporation are in Brussels this week for discussions with the Belgian Government on the problem of the supply of the Belgian diamond market and full employment in the diamond industry.

The London Metal Market

(From Our Metal Exchange Correspondent)

There has been rather more activity in the London tin market this week, and the tone has again been firm. Similar conditions have prevailed in the Eastern market where the price continues to be well above the London and New York parities. Continental demand by switch operators has slackened somewhat, and it remains to be seen whether this is only a temporary phase.

It is reported that the Bolivian Government yesterday placed under control the mining and banking operations of three of the largest tin-mining companies, namely, the Patino, Aramayo and Hochschild concerns.

Lead has continued an active market with daily sales by producers' representatives, and as consumers have been adopting a cautious attitude prices have fallen well below the £100 per ton mark. A moderate amount of metal for prompt delivery has been disposed of, and the premium for this seems to be settling down at about £2 per ton. The American price was reduced 1c. on Tuesday to 15c. per lb.

Demand for zinc has been slow, and the Continental price is around £98-£99 per ton. American producers reduced their price yesterday, and the general quotation there is now 13½c. per lb.

There has been very little business passing in copper. The Chilean price remains at 35½c. per lb., whilst the European price is about 34½c.-35½c. per lb.

On Thursday the official close on the tin market was: Settlement price £972, Cash Buyers £971 10s., Sellers £972; Three months' Buyers £957 5s., Sellers £957 10s. In the afternoon the market was firm. Turnover for the day was 190 tons. Approximate turnover for the week was 585 tons.

The Eastern price on Thursday morning was equivalent to £980 15s. per ton c.i.f. Europe.

On Thursday the official close on the lead market was: October Settlement—Buyers £91 5s., Sellers £91 15s. January Settlement—Buyers £91 5s., Sellers £91 15s. In the afternoon the market was very steady. Turnover for the day was 2,250 tons. Approximate turnover for the week was 7,220 tons.

PRODUCTION OF TIN CONCENTRATES — AUGUST
(long tons)

	August, 1952	*Jan.-Aug.* 1952	*Jan.-Aug.* 1951
Belgian Congo.....	755	8,752	8,175
Bolivia*	*3,069a*	*16,564b*	*17,081c*
Indonesia.....	3,419	21,951	19,930
Malaya.....	4,755	37,802	37,845
Nigeria.....	762*e*	5,366	5,492
Thailand	771	5,838	7,227

Source: International Tin Study Group. *Exports: *a*—June, 1952; *b*—Jan.-June, 1952; *c*—Jan-June, 1951; *e*—Estimated.

U.K. PRIMARY METAL STATISTICS—AUGUST
(long tons)

	Refined Copper	*Lead*†	*Slab Zinc*	*Tin Metal*
Stocks in U.K. August 1...	89,278	116,283	106,112	4,789‖
Imports.....	18,711	7,150	21,034	154
Production	8,557	6,232	4,949	2,702*
Consumption	24,772	12,402	10,847	1,374
Exports and Re-exports ...	82	56	4	1,549
Stocks in U.K. August 31‡	91,864	116,480	124,402	4,530‖

(Source: British Bureau of Non-Ferrous Metal Statistics)
(*) Estimated by International Tin Study Group. (†) Includes imported virgin lead and English refined from domestic ore and secondary metal. (‡) Including Government stocks other than strategic reserves. (‡) In addition U.K. stocks of blister copper at the end of August were 29,288 tons; of zinc concentrates were 38,104 tons; and of tin in ore were 1,968 tons. (‖) Including tin in official warehouses and smelter carry-over.

OCTOBER 9 PRICES

COPPER

Electrolytic ... ... £285 0 0 d/d

LEAD AND TIN

(See our London Metal Exchange report for Thursday's prices)

ZINC

G.O.B. spelter, foreign, duty paid ... £118 0 0 d/d
G.O.B. spelter, domestic... ... ... £118 0 0 d/d
Electrolytic and refined zinc ... ... £122 0 0 d/d
Special high grade ... ... £124 0 0 d/d

ANTIMONY

English (99%) delivered, 10 cwt. and over ... ... £225 per ton
Crude (70%) ... ... £210 per ton
Ore (60% basis) ... ... 20s. — 22s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade) ... ... £454 per ton

OTHER METALS

Aluminium, £157 per ton.
Bismuth, 17s. lb. (min. 2 cwt. ex-warehouse).
Cadmium, (Empire) 14s. 4d. lb.
Chromium, 6s. 6d. lb.
Cobalt, 20s. lb.
Gold, 248s. f.oz.
Iridium, £65 oz. nom.
Magnesium, 2s. 10½d. lb.
Manganese Metal (96%-98%) 2s. 2d./2s. 3d. per lb. d/d
Osmiridium, £35 oz. nom.
Osmium, £70 oz. nom.
Palladium, £8 10s. oz.
Platinum, £27/£33 5s. nom.
Rhodium, £45 oz.
Ruthenium, £30 oz.
Quicksilver, £64 10s. ex-warehouse
Selenium, 25s. nom. per lb.
Silver 73d. f.oz. spot and f'd.
Tellurium, 18s./19s. lb.

ORES, ALLOYS, ETC.

Bismuth ... ... 40% 7s. 6d. lb. c.i.f.
30% 6s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (lumpy) £14 2s. per ton c.i.f.
" " (concentrates) £14 2s. per ton c.i.f.
" " Refractory £13 14s. per ton c.i.f.
Baluchistan Metallurgical ... £15 8s. per ton c.i.f.
Magnesite, ground calcined ... £26 - £27 d/d
Magnesite, Raw ... ... £10 - £11 d/d
Molybdenite (85% basis) ... 105s. 10d. per unit c.i.f.
Wolfram (65%) ... ... 425s. c.i.f. U.K. buying
" ... ... 447s. 6d. d/d U.K. selling
Tungsten Metal Powder (for steel manufacture) ... 31s. 7d. nom. per lb. (home)
Ferro-tungsten ... ... 28s. 7d. nom. per lb. (home)
Carbide, 4-cwt. lots ... ... £32 3s. 9d. d/d per ton
Ferro-manganese, home ... £49 0s. 8d. per ton
Manganese Ore U.K. (48% - 50%) ... ... 6s. per unit
Brass Wire ... ... 2s. 9d. per lb. basis.
Brass Tubes, solid drawn ... 2s. 3½d. per lb. basis.

THE MINING MARKETS

(By Our Stock Exchange Correspondent)

Gilt-edged stocks were quietly steady. The success of the Government's funding operations is anticipated. Very little business was transacted but the undertone was confident. The market was cheered by news that a credit balance had been achieved with E.P.U. and that the U.K. had earned a surplus of £24,000,000 for the first half of 1952 compared with a deficit of £394,000,000 for the second half of 1951. The Chancellor's speech at the Mansion House was studied with interest but city opinion has long been critical of the high rate of government expenditure, which it believes the country cannot afford.

Mining shares were generally idle. With interest lacking, prices dwindled, although the undertone was quite steady. Interest in Kaffir shares was mainly restricted to uranium producing mines. Vogelstruisbult Gold Mining is joining this group. It is hoped that the extraction plant will be ready to operate by the middle of 1954. The necessary finance will be provided on loan and a new issue will not be required. Stilfontein are making a new issue of one new 5s. share for every ten held at a price of 18s. Consolidated Main Reef remained unchanged after the figures for the year ending June 30, 1952 had been announced. The working profit is down by about £120,000 on the previous year. The report states that a substantial tonnage of low grade ore was rendered unpayable due to rising costs. General Mining 6 per cent Preference Shares opened at around 20s. 6d. Doornfontein rose slightly following buying in anticipation of good development results in the coming quarterly report.

O.F.S. issues followed the easier trend of Rand shares. Welkom encountered selling. The rich gold strike in the Harmony LR8 borehole was again proved in the first deflection. At a depth of 5,041 ft. a value of 1,532 dwt. was obtained from the Basal Reef. The shares hardened slightly against the general trend. President Brand fell. A new issue is rumoured in the near future. Readers will recall that an increase of capital was authorized last May.

West Africans were mainly the turn easier but more interest was displayed in this section. Ashanti Gold recorded an estimated profit of £80,700 for the month of September, which shows only a very slight reduction on the August figures. The profit for the financial year ended August comes out at £827,406 against £1,075,926 for the previous year. Ariston continue to do well. This mine also completed its financial year at the end of August but shows an increased profit at £603,509 compared with £548,907 for the preceding period.

Coppers were generally unsettled due to the protracted wage dispute with the African Union. Esperanza remained steady following persistent vague rumours that good developments could be expected before long. Roan Antelope improved against the general tendency following the increased dividend. The company is paying a total of 45 per cent for the year on an increased capital. Rhodesia Selection Trust is again making the same distribution. Mufulira, the mine in which the company is principally interested, is distributing 8s. 3d. per £ share. This is equivalent to last year when the capital was increased with a 66⅔ per cent bonus. Rhodesia Selection Trust fell 9d. on some market disappointment. No news has yet been received concerning the possible emigration of these two concerns.

Lead/zinc issues fell away due to the lower lead price on the London Exchange. North Broken Hill were the most affected. The maintained dividend proved unpopular. It seems probable that another fall in share prices would occur should zinc also be returned to free trading.

Tin shares recorded little change but sentiment was sound. Beralts were again active following the publication of the good financial position. Some market circles anticipate a sharp rise from the ex-dividend price which will first be quoted on October 15.

Asbestos shares were in demand with Turner and Newall outstanding. Central Provinces Manganese hardened but Associated fell again on the uncertain outlook.

Montreal recorded more active trading conditions but share prices generally eased with the exception of Nickels which encountered some buying.

	Price Oct. 8	+ or − on week
FINANCE		
African & European	2⅜	
Anglo American Corpn.	6⅛	−⅛
Anglo-French	19/4½	
Anglo Transvaal Consol.	26/3	
Central Mining (£1 shrs.)	33/1½	−7½d
Consolidated Goldfields	43/9	
Consol. Mines Selection	25/10½	
East Rand Consols	2/4½	−1½d
General Mining	4½	
H.E. Prop.	32/6	+7½d
Henderson's Transvaal	9/6	−6d
Johnnies	2⅜	+⅛
Rand Mines	4⅞	
Rand Selection	38/1½	−1/3
Strathmore Consol.	26/3	−2/6
Union Corp. (2/6 units)	31/10½	−7½d
Vereeniging Estates	3⅛	
Writs	30/-	−7½d
West Wits	42/6	−3d
RAND GOLD		
Blyvoors	41/6	−1½d
Brakpan	16/10½	−1½d
City Deep	29/4½	−1/10½
Consol. Main Reef	32/6	
Crown	39/4½	−7½d
Daggas	3⅜	+⅛
Doornfontein	26/6	+3d
Durban Deep	3⅛	
E. Daggas	17/9	−3d
E. Geduld ... (4/- units)	41/3	−7½d
E. Rand Props.	3⅛	
Geduld	6	
Govt. Areas	12/6	
Grootvlei	29/3	
Libanon	12/1½	+1½d
Luipaards Vlei	22/6	+9d
Marievale	20/-	
Modderfontein East	22/6	
New Kleinfontein	28/10½	
New Pioneer	14/3	−9d
Randfontein	24/6	+1/3
Robinson Deep	11/6	−3d
Rose Deep	23/9	
Simmer & Jack	6/-	−1½d
S.A. Lands	37/6	
Springs	7/-	−1½d
Stilfontein	23/6	−1/10½
Sub Nigel	2⅛	−⅛
Van Dyk	12/9	
Venterspost	19/3	
Vlakfontein	16/9	
Vogelstruisbult	28/3	+3d
West Driefontein	5⅜	−⅛
W. Rand Consolidated	51/3	+7½d
Western Reefs	44/4½	+7½d
O.F.S.		
Freddies	7/6	+3d
Freddies N.	8/4½	
Freddies S.	7/9	+6d
F.S. Geduld	2½	−⅛
Geoffries	16/-	
Harmony	20/1½	+1½d
Loraine	7/3	−3d
Lydenburg Estates	10/6	
Merriespruit	4/-	
Middle Wits	15/9	+1½d
Ofsits	40/7½	−7½d
President Brand	21/9	−4½d
President Steyn	19/6	−1½d
St. Helena	16/-	−4½d
U.F.S.C. & G.	6/10½	−1½d
Virginia Ord.	13/9	+4½d
Welkom	23/1½	−1/3
Western Holdings	3½	−⅛
WEST AFRICAN GOLD		
Amalgamated Banket	1/7½	−1½d
Ariston	6/1½	−1½d
Ashanti	16/9xd	−7½d
Bibiani	6/-xd	−1½d
Bremang	2/3	
G.C. Main Reef	3/9	
G.C. Selection Trust	6/10½	−4½d
Konongo	2/4½	
Lyndhurst Deep	1/-	−1½d
Marlu	1/7½	
Taquah & Abosso	3/-	−3d
AUSTRALIAN GOLD		
Boulder Perseverance	2/3	
Gold Mines of Kalgoorlie	10/3	
Great Boulder Prop.	5/4½	
Lake View and Star	16/-	−3d
Mount Morgan	18/10½	+3d
North Kalgurli	12/-	−6d
Sons of Gwalia	7/9	
South Kalgurli	7/6	−1½d
Western Mining	9/4½	+6d
MISCELLANEOUS GOLD		
Cam and Motor	41/3	+7½d
Champion Reef	6/3	−3d
Falcon Mines	8/9	−3d
Globe & Phoenix	24/3	
G.F. Rhodesian	6/4½	−1½d
London & Rhodesian	5/3	−1½d
Motapa	2/-	
Mysore	3/3	−3d
Nundydroog	5/3	−3d
Ooregum	2/6	
Oroville	11/3	
MISCELLANEOUS GOLD (contd.)		
St. John d'El Rey	26/3	+3d
Zams	38/-	−3d
DIAMONDS & PLATINUM		
Anglo American Inv.	4⅛	
Casts	28/9	−6d
Cons. Diam. of S.W.A.	4	−⅛
De Beers Defd. Bearer	65/9xd	+6d
De Beers Pfd. Bearer	14⅜	−⅛
Pots Platinum	9/3	
Watervaal	15/-	
COPPER		
Chartered	60/3	−6d
Esperanza	4/1½	
Indian Copper	4/3	−1½d
Messina	4⅜	+⅛
Nchanga	7⅛	−⅛
Rhod. Anglo-American	62/3	−1/3
Rhod. Katanga	15/6	
Rhodesian Selection	19/7½	−9d
Rhokana	23⅜	−⅛
Rio Tinto	25⅛	−⅛
Roan Antelope	15/3	+4½d
Selection Trust	45/6	−1/4
Taaks	63/3	+6d
Tharsis Sulphur Br.	45/-	
TIN (Eastern)		
Ayer Hitam	25/6	
Bangrin	8/10½	+1½d
Gopeng	11/1½	+1½d
Hongkong	6/9	+1½d
Ipoh	21/10½	
Kamunting	12/1½	
Kepong Dredging	7/9	+1½d
Kinta Tin Mines	12/1½	
Malayan Dredging	23/6xd	−3d
Pahang	17/-	+3d
Pengkalen	10/3	+6d
Petaling	14/6	+1½d
Rambutan	12/6	
Siamese Tin	23/4½	−4½d
Southern Kinta	15/10½	−1½d
S. Malayan	26/9xd	−3d
S. Tronoh	13/-	
Sungei Kinta	19/4½	−4½d
Tekka Taiping	7/6	
Tronoh	23/3	−9d
TIN (Nigerian and Miscellaneous)		
Amalgamated Tin	10/9xd	−9d
Beralt Tin	34/6	+2/-
Bisichi	4/7½	−1½d
British Tin Inv.	15/-	−1½d
Ex-Lands Nigeria	5/3	
TIN (Nigerian and Miscellaneous) contd.		
Geevor Tin	13/9	+3d
Gold & Base Metal	3/7½	+3d
Jantar Nigeria	10/10½	−9d
Jos Tin Area	10/1½	
Kaduna Prospectors	4/-	
Kaduna Syndicate	4/6	
London Tin	5/6	
United Tin	2/10½	+1½d
SILVER, LEAD, ZINC		
Broken Hill South	47/6	−2/6
Burma Corporation	1/9	
Consol. Zinc	28/-	−9d
Lake George	14/6	−9d
Mount Isa	36/6	−2/9
New Broken Hill	24/-	−1/6
North Broken Hill	56/10½	−3/1½
Rhodesian Broken Hill	16/3	−1/9
San Francisco Mines	30/-	−1/-
Uruwira	4/6	−4½d
MISCELLANEOUS BASE METALS & COALS		
Amal. Collieries of S.A.	50/-	
Associated Manganese	39/9	−1/3
Cape Asbestos	18/7½	+6d
C.P. Manganese	49/-	+6d
Consol. Murchison	30/-	
Mashaba	8d	
Natal Navigation	3⅜	
Rhod. Monteleo	12/9	−3d
Turner & Newall	93/-	+3/-
Wankie	17/6	−3d
Witbank Colliery	2⅜	−⅛
CANADIAN MINES		
Dome	$37½	−$1½
Hollinger	$30½	−$½
Hudson Bay Mining	$115	−$2
International Nickel	$84½	+$½
Mining Corpn. of Canada	£5⅜	−£⅛
Noranda	$157	−$2
Quemont	£6⅛	−£⅛
Yukon	4/3	−3d
OIL		
Anglo-Iranian	5⅜	+⅛
Apex	43/9	−7½d
Attock	21/10½	
Burmah	44/9	+1/6
Canadian Eagle	33/3	+9d
Mexican Eagle	24/-	
Shell (bearer)	85/-	+1/6
Trinidad Leasehold	31/-	
T.P.D.	26/3	
Ultramar	30/1½	+3d

COMPANY NEWS AND VIEWS

Rhodesian Copper Companies' Big Tax Liabilities

Production figures and operating surpluses for the year ended June 30 last of Roan Antelope and Mufulira Copper were published in our issue of August 29, the results being taken from the companies' cumulative quarterly returns. The returns did not, however, give any details concerning the allocation of the operating surpluses as between taxation, reserves, and dividend distribution. These have now been published in the preliminary statements of profits and dividends for the year together with the preliminary statement of accounts of Rhodesian Selection Trust, whose chief asset is a holding of 64 per cent of the issued share capital of Mufulira Copper Mines.

Roan Antelope, by declaring a final dividend of 1s. 7½d. per 5s. unit, making a total of 2s. 3d. for the year, was fully up to market expectations and compares with 1s. 7.6d. per unit on its present capital structure after the capitalization of reserves effected in July, 1951. Mufulira and Rhodesian Selection Trust's total distributions, however, were maintained at the same rate as for the previous year, the final distribution by Mufulira of 5s. 3d. per £1 share brought the total distribution to 8s. 3d., while R.S.T's final of 1s. 3d. brought its total distribution to 2s. per 5s. share.

But the immense off-take in taxation from both Roan and Mufulira must come as a painful reminder that the Treasury has not yet come to a decision on the application of these companies to milder taxation climes. Of Roan Antelope's profit, before tax, amounting to £8,531,681 (£5,917,366) taxation absorbs no less than £5,888,767 (£4,120,694), while out of Mufulira's profits, before tax, of £8,269,743 (£7,876,509) taxation liabilities totalled £5,651,927 against £5,111,714. Nevertheless, the companies were able to increase their allocation to reserves and their forward balances.

The full accounts of each of the three companies will be posted to shareholders on November 8. The annual meeting of Roan Antelope will be held on December 3 and the meetings of Rhodesian Selection Trust and Mufulira on the following day.

Stilfontein Offers One for Ten at 18s.

Stilfontein Gold Mining has announced the offer to shareholders registered on November 11 of one new 5s. share at 18s. per share for every ten shares held. Subscribers for the new shares will, moreover, be given free options exercisable at any time between December 30, 1952, and November 30, 1953, to take up one further share at 22s. 6d. for each two new shares subscribed.

The circular announcing this offer also disclosed that the estimated cost to the company of extending its uranium plant will be £2,000,000, while a further £500,000 is considered necessary as a margin for general purposes. Thus the borrowing powers authorized last year to enable uranium production to be undertaken would be insufficient, so that shareholders will be asked at the extraordinary general meeting to be held in Johannesburg on October 27 to empower the directors to increase the total amount of money which can be raised by borrowing from £5,500,000 (exclusive of Loan Stock) to £8,000,000.

In order to compensate Loan Stockholders for this increase, it is proposed that the first conversion right attached to their Loan Stock, which at present entitles them to convert 25 per cent of their holdings into 18 ordinary shares—equivalent to a price of 27s. 9d. per share, be amended to provide for conversion of that amount into 22 ordinary shares, equivalent to approximately 22s. 9d. per share. The final date for exercising this conversion right is to be extended to November 30, 1953. Stockholders who exercise the first conversion right between now and November 11 will be entitled to participate in the new offer of ordinary shares and options.

Although Stilfontein began production as recently as July 1 last, it is now apparent that full production can be obtained, "several years earlier than was planned." Milling capacity is to be increased to 80,000 tons per month by the end of 1953 and this unexpected stepping up of both the tempo and scale of operations will result in heavy capital expenditure which cannot be met, in full, from gold mining profits. While the Directors do not think that this will cause the overall capital requirements of the mine to differ greatly from the original estimates, it has meant that the need for fresh funds has become immediate which explains the present offer and the attractive option rights attached.

Rand and O.F.S. Mine Returns for September

The Rand and O.F.S. gold producers failed to display any decided trend in costs during September.

Several mines, however, reported higher profit figures, the most impressive being Stilfontein and West Driefontein, although others to show good advances included Durban Deep, Modderfontein East, Welkom, Government Areas and Libanon.

On the other hand, profits were noticeably lower in the case of Daggerfontein, East Rand Proprietary, Rand Leases and Robinson Deep.

Gold revenue was based on a price of 249s. 10d. per f.oz. compared with 249s. 3d. in August and 249s. 6d. in the month of July.

The cost figure given for South African Lands of 33s. 1d. per ton, an increase of 3d. over the preceding month, is subject to correction.

Company	September, 1952 Tons (000)	Yield (oz.)	Profit (£000)	Year ends	Current Financial Year Total to Date Tons (000)	Yield (oz.)	Profit (£000)	Last Financial Year Total to Date Tons (000)	Yield (oz.)	Profit (£000)
Gold Fields										
Libanon	83	16603	43.6	J	249	49,806	128	254	47,095	130
Luipaards V.	102	19329	52.8	J	309	58,205	156	302	56,007	177
Rietfontein	26	5982	27.3	D	243	54,124	249	245	54,553	282
Robinson	108	18090	12.9	D	1014	166,451	108	1005	158,789	103
Simmer & J.	120	19199	14.0	D	1113	177,452	144	1121	178,036	280
Sub Nigel	66	22909	122.4	J	201	69,791	371	199	70,363	397
Venterspost	104	23920	63.5	J	313	71,465	189	298	64,967	213
Vlakfontein	38	13986	80.3	D	335	124,536	712	330	124,086	724
Vogels	83	21684	83.5	D	716	187,133	728	691	173,967	748
West Drei	25	15259	109.9	J	76	44,255	306	—	—	—
Anglo American*										
Brakpan	119	21138	32.6	D	1055	190,688	329	1035	194,445	526
Daggas	231	54782	380.2	D	2098	499,815	3537	2088	514,947	3918
East Daggas	94	16580	61.2	D	867	154,782	570	892	163,804	756
S. A. Lands	108	19455	65.2	D	997	179,748	637	1027	179,915	720
Springs	165	21782	20.5	D	1484	194,537	172	1510	196,024	301
Welkom	57	10190	7.4	D	440	74,687	L51	—	—	—
W. Reef Ex.	116	23910	102.4	D	1008	210,714	928	895	199,219	1016
Central Mining										
Blyvoor	105	63259	550.7	J	323	195,524	1711	326	212,598	1935
City Deep	144	31125	23.3	D	1378	279,421	232	1465	296,783	653
Consol M.R.	182	25066	27.0	J	555	77,022	92	586	79,086	154
Crown	275	43160	44.5	D	2417	389,920	350	2459	416,863	896
D. Roodep'rt	185	32481	92.8	D	1626	279,192	762	1612	276,396	914
East Rand P.	194	42942	128.7	D	1861	399,551	1322	1976	402,535	1626
Modder B.	55	6003	5.5	D	509	56,158	59	488	55,839	83
Modder E.	120	13681	28.1	J	359	41,226	74	362	42,632	112
Rose Deep	80	11163	8.3	D	749	104,131	91	743	105,112	194
Welgedacht	34	4033	4.4	J	103	12,520	13	100	11,806	12
J.C.I.*										
E. Champ	29	4452	8.1	D	274	41,627	74	293	43,543	99
Govt.G.M.A.	253	32279	52.3	D	2193	288,782	450	2053	282,668	513
New State	44	5736	1.0	D	408	56,924	9	543	69,433	26
Randfontein	343	41638	30.3	D	3160	374,445	266	3063	371,267	422
Wit. Gold	60	6972	2.5	D	538	64,064	22	531	61,279	32
Union										
East Geduld	145	43501	346.6	D	1306	391,843	3104	1308	392,449	3210
Geduld Prop.	105	15214	31.2	D	944	136,968	317	944	138,695	411
Grootvlei	192	41573	266.7	D	1747	378,490	2430	1755	393,123	2663
Marievale	61	15402	72.1	D	546	136,975	637	546	135,809	674
St. Helena	54	10738	10.5	D	430	84,963	48	—	—	—
Van Dyk	100	14900	11.8	D	958	138,822	111	901	135,947	161
General Mining*										
S. Roodep'rt	27	6115	23.0	J	82	18,578	70	81	18,020	69
W.RandCon.	228	33980	124.4	D	1922	298,533	1113	1905	304,332	1457
Anglo Transvaal*										
N. Klerksd'p	11	1341	1.0	D	101	11,396	9	81	9,564	11
Rand Leases	182	30186	58.5	J	555	92,561	198	553	92,259	261
Village M.R.	34	5269	14.7	J	101	15,868	45	103	15,864	55
Others										
N. Kleinf't'n	108	14075	30.1	D	958	125,920	580	968	125,929	380
Spaarwater	11	2418	L1.5	D	94	*21,349	L22	93	21,163	L19
Stilfontein	47	10341	15.9	D	130	25,347	0.1	—	—	—
W. Nigel*	17	—	7.9	J	50	—	21	30	—	2

Notes.—Profit figures are in all cases figures of working profit excluding profit from sale of gold at premium prices. In case of groups marked with an asterisk (*) profit includes sundry revenue. Profit figures preceded by L indicate a loss.

"Indians" Continue to Make Steady Progress

The four Kolar Gold Fields producers' August monthly returns show that this group's scale of operations has not slackened. However, Champion Reef's results, if anything, were below average, but Mysore maintained its high tonnage throughput and indications are that this year's results will be in sharp, but pleasing, contrast to those obtained last year. Nundydroog announced the

highest monthly throughput and recovery for over two years and, at this juncture, results show up well against those of the preceding year.

Company	August, 1952 Tons (000)	August, 1952 Yield (oz.)	No. of Months	Current Financial Year Total to Date Tons (000)	Current Financial Year Total to Date Yield (oz.)	Last Financial Year Total to Date Tons (000)	Last Financial Year Total to Date Yield (oz.)
Champion Reef..	13	5,912	5	65	29,564	74	30,161
Mysore.....	18	6,244	5	89	31,678	82	25,812
Nundydroog* ...	24	6,021	5	109	27,598	96	23,425
Ooregum	9	3,309	5	53	15,864	52	13,609

*Includes tailings.

Ooregum reported an average tonnage throughput but an improvement in the grade of ore treated raised the production figure to one of the best achieved over the last two years.

Mining Matters

Professor J. A. S. Ritson Elected I.M.M. President for 1953-54.—The Council of the Institution of Mining and Metallurgy have announced the election of Professor J. A. S. Ritson, O.B.E., D.S.O., M.C., as President for the Session, 1953-54. He will take office at the General Meeting to be held on May 28 next.

Professor Ritson, who is a Past President of the Institution of Mining Engineers, was elected a Member of the Institution of Mining and Metallurgy in 1936, and has served continuously on the Council since 1940, for three sessions as Vice-President. On September 30 last he officially retired from his position of Professor of Mining at the Royal School of Mines.

Matlock Lead Mines was registered in the U.K. on October 2 last. This company has been formed jointly with the Derbyshire Stone Co. and the Selection Trust group. Johannesburg Consolidated Investment will act as secretaries. The registered office of the new company is 10/11 Austin Friars, E.C.2.

The directors of the new company are Mr. John Hadfield, chairman and managing director of Derbyshire Stone and chairman of John Hadfield & Sons; Mr. Harry J. Joel, director of Johannesburg Consolidated Investment; Mr. Alexander W. Christie, director Llanrwst Lead Mines; Mr. Walter Blair, director of the Abbeytown Mining Co.; and Mr. Thomas H. Bradford, managing director of Trepca Mines.

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AUTHORISED CAPITAL..... **£3,300,000**
ISSUED CAPITAL (24,000,000 Shares of 2/6 each)... **£3,000,000**

Extracted from the Annual Report for the Year ended June 30, 1952

Tonnage milled 1,298,000

		Per ton milled
Total Working Revenue.....	£10,587,604	£8 3 2
Total Working Expenditure	2,892,285	2 4 7
Working Profit	**£7,695,319**	**£5 18 7**
Total Profit for the year.....		**£7,734,028**
Balance unappropriated at June 30, 1951.....		943,899
Forfeited Dividends.....		151
		£8,678,078
This amount has been dealt with as follows:—		
Taxation	£3,240,953	
Mineral Lease Consideration	784,337	
		4,025,290
		4,652,788
Dividends declared during the year—No. **12** of **1s. 4d.** per share and No. **13** of **1s. 6d.** per share.....		3,400,000
Leaving a balance unappropriated of.....		**£1,252,788**

The **Ore Reserve** was re-estimated as at June 30, 1952, as follows:—

Reef	Available Tons, 000's	Available Value, Dwt.	Available Width, Inches	Shaft and Safety Pillars Tons, 000's	Shaft and Safety Pillars Value, Dwt.	Shaft and Safety Pillars Width, Inches	Total Tons, 000's	Total Value, Dwt.	Total Width, Inches
Carbon Leader	5,527	12.5	46.4	1,250	12.6	45.6	6,777	12.5	46.2

Compared with the previous year the available reserve increased by **10,000** tons, the value was **0.5** dwt. per ton lower and the stope width **0.2** in. greater. The unavailable tonnage increased by **118,000** tons, the value was unchanged and the stope width **0.2** in. less.

Satisfactory progress has been made in the sinking of A1, A2 and A3 Sub-incline Shafts and in the preparatory work in connection with A4 Sub-incline Shaft. Operations have commenced on the haulages south from Nos. 1 and 2 Shafts to the proposed sites of the Sub-vertical Shafts.

The full Report and Accounts may be obtained from the London Secretaries, A. MOIR & CO., 4, London Wall Buildings, London, E.C.2.

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INDIAN COPPER CORPORATION LTD.

The Twenty-Eighth Annual General Meeting of the Indian Copper Corporation Ltd. was held in Calcutta on Wednesday, October 8th, 1952, **Mr. K. R. Fettes** (the Chairman) presiding.

The following is the Chairman's circulated statement:

On this occasion I am continuing the practice of your previous Chairman, Sir Godfrey Fell, of circulating the Chairman's address with the Accounts, so that it will be available to all the Stockholders of the Company, dispersed as they are throughout India, Pakistan and overseas.

Before commenting on the Accounts, I would like to make reference to your former Chairman, Sir Godfrey Fell, and to the former Directors who so ably assisted him in the conduct of the Company's affairs. During their long years in office the Company has gone from strength to strength, and it is fitting that they should have decided to recommend the transfer of control, in the interests of the stockholders, after what has proved to be a record year in the Company's history. It must be gratifying to them to know that, as a result of their labours, they have handed over an efficient, well-organized and financially sound unit to the new management.

Accounts.—The properties of the Company have again been well maintained and adequate Depreciation has been provided. As you will have observed, the total Current Assets exceed the Current Liabilities and Tax Reserve by £1,041,367 which is a satisfactory figure, though it is to be noted that the Current Assets include stocks of manufactured products amounting to £932,807. These stocks are £280,047 higher than at the end of the previous year due to the decrease in the tonnage sold during the year. As at December 31, 1951, cash with Bankers and in hand amounted to £313,331 but since that date heavy tax payments have had to be made which have absorbed almost this sum.

The profit for the year of £889,712, before providing for taxation and depreciation is a record for the Company, and as a result of the transfer of control the combined U.K. and Indian tax payable is lower than it would otherwise have been. In future years the profits will not be subject to any U.K. taxation and this will benefit the Company.

In considering the question of Dividend your Directors have taken into account the necessity to conserve funds for the development of the Company's activities, and for financing the present high stocks of manufactured products. They have therefore recommended a Dividend of 12½ per cent free of income tax payable by the Company, and a sum of £175,000 has been transferred to General Reserve to strengthen the Company's resources. After making these allocations the amount carried forward at the credit of the Profit and Loss Account will be increased from £40,103 to £85,540.

Copper Leases—Operating Results.—A detailed review of the year's operations is given in your General Manager's Report, which can be seen during office hours at the Company's head office.

The main features are briefly summarized in the Directors' Report. The ore treated in the Mill was the second highest, being only 2,267 s.tons below the record in 1940. An increased grade of ore together with a somewhat greater tonnage milled were responsible for the increase in refined copper produced which at 7,083 tons is the highest since 1936.

The Rolling Mill production decreased a further 1,151 tons as compared to the previous year. This drop in production was necessitated by market conditions and transport restrictions which improved towards the close of the year.

Development.—Although the total footage developed increased, the payable ore, average copper percentage, and stoping width decreased slightly compared with the previous year's results, due to a larger percentage of exploration development through barren areas.

Ore Reserves.—The increase of 137,196 s.tons now brings the total estimated ore reserves to a record figure of 3,224,391 s.tons, of which the largest increase is again at Mosaboni, where development is proceeding in satisfactory areas down to the 20th level, or a vertical depth of over 2,200 ft. from the surface.

The main development for the ore reserves at Mosaboni was around the 17th, 18th and 19th levels to the North, and although no improvement in the copper percentage as the depth increases has been proved, there are no signs of deterioration.

The main development for the ore reserves at Badia was around the 8th and 9th levels to the North, but results so far indicate that the copper percentage is not improving with the depth.

At Dhobani Mine development is suspended, although it continues to produce a small but useful tonnage of payable ore.

SALES.—Although the rapid increase during the year of world prices for metals was not so marked in copper and brass, the average prices obtained for the Corporation's products increased by approximately 40 per cent. The average selling prices during the year being copper ingots £240, rolled brass £277, yellow metal circles £302, rolled copper £301 and copper circles £334 per l.ton.

Kyanite Lease.—The output and transport to rail head and docks were satisfactory, but due to Central Government's restrictions on export the despatches decreased by over 50 per cent as compared to the previous year.

Because of this export restriction, and an increase in world demand for kyanite, rapid increases in price occurred from £15 to £22 per ton f.o.b. with a further increase to £28 per ton at the beginning of 1952.

It is doubtful if these high prices can be maintained, as the consumers, in a limited, market are rapidly exploring the possibility of using cheaper substitutes.

LABOUR.—Labour conditions throughout the year were good and continue to remain satisfactory.

Staff.—The Company is fortunate in having an efficient and loyal staff both at the works and at the mines, and our thanks are due to them for another year of excellent service. It is gratifying that your General Manager, Mr. E. R. Dempster, has accepted a seat on the Board where his experience and advice are invaluable, and that during his absence on leave we have Mr. N. A. B. Hill to act for him as General Manager and Alternate Director.

The year under review, despite increased operating costs and lower despatches, has shown a result which I am sure you will consider very satisfactory. The increase in unsold stocks, however, gives cause for concern, and the recession in the world metal market since the close of the year has not helped the position. Sales and prices have not been as good as in 1951, but there are signs that demand is again improving.

The Report and Accounts were adopted.

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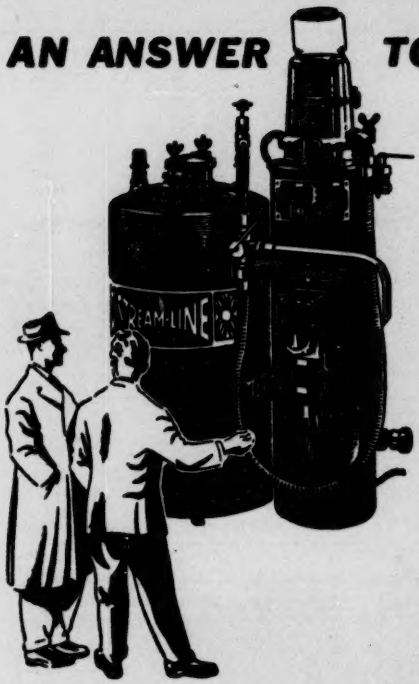

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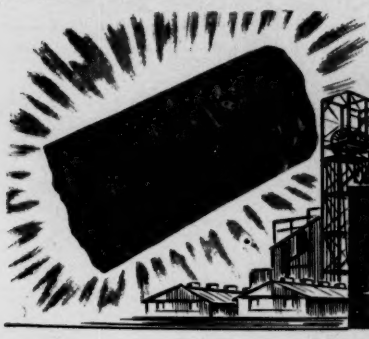

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